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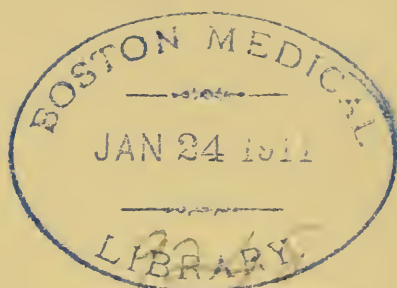
THE
NEUROSES
OF THE
GENITO-URINARY SYSTEM
IN THE MALE,
WITH
STERILITY AND IMPOTENCE.

BY
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PROFESSOR OF GENITO-URINARY DISEASES IN THE UNIVERSITY OF VIENNA.

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TRANSLATOR'S NOTE.

THIS translation, published with the author's permission, is of the two monographs, "Ueber die Neuropathien (Neurosen) des männlichen Harn- und Geschlechtsapparates" and "Ueber Potentia generandi und Potentia coeundi." It is hoped that a wider circulation than has heretofore been accorded in this country to the sound pathological teachings and successful methods of treatment of so eminent an authority as Prof. Ultzmann will throw light on the management of this very difficult and refractory class of cases.

Inasmuch as the two parts treat of kindred subjects there is some necessary repetition in the original. This has been to some extent avoided by slightly abridging the second part. The omissions are indicated by references to the first part.

G. W. A.

March, 1889.

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THE NEUROSES OF THE GENITO- URINARY SYSTEM IN THE MALE.

THE neuroses of the male urinary and sexual system belong among the more frequent forms of disease. Although the nervous diseases of the urinary system, as well as those of the sexual organs, may occur alone, still we find not infrequently several forms of nervous disease of both systems in the same individual, usually united by one and the same ætiological origin, so that it seems best to treat of the neuroses of the urinary and of the genital organs in the same connection.

The ætiology of this class of disease may vary greatly. Now it is to be sought in local changes of the so-called neck of the bladder (prostatic urethra), and now in general disturbances of nutrition.

The general disturbances of nutrition appear sometimes in consequence of chronic brain and spinal affections, or they consist in that exalted, abnormal reflex excitability, sometimes inherited and congenital, usually, however, associated with anæmia and a feeble constitution. Per-

sons of a perfectly normal constitution may nevertheless acquire an exalted reflex excitability, which disposes to neurosis of the genito-urinary system, if they weaken their organism by overstrained physical, but especially by exciting mental, activity long kept up. Not infrequently, indeed, we find nervous vesical tenesmus (cystospasmus) in persons who have exacting night work to do, or in individuals who, in addition to severe mental activity, hold an unusually responsible position, as with cashiers, secretaries, and such persons. Even so also the cares of life engender the most varied neuroses in the urinary system. Still further, shocks to the general nervous system, great fright, pain, and grief, give rise to nervous disturbances as well of the urinary as of the sexual functions. The immediate influence of the central nervous system on the urinary apparatus may even be observed in children, when they from fear of threatened punishment pass urine involuntarily in their clothes. Likewise we see vesical tenesmus, with polyuria show itself in individuals who keep themselves in a state of long-continued excitement; as, for instance, candidates before severe examinations, when the result is uncertain, or in persons who have engaged in a mercantile speculation of doubtful outcome. Great and unexpected loss of property, such as sometimes occurs in unfort-

unate stock operations, or the death of a beloved person, may also cause the most varied nervous phenomena in the urinary and sexual apparatus. Thus I have often seen in the case of seriously damaged business-men frequent micturition, polyuria, sometimes even slight glycosuria, and, further, sexual impotence, emissions, and spermatorrhœa suddenly appear.

A much larger contingent in these nervous cases, however, is furnished by those manifestations of disease which have their origin in local changes in the urinary system, and which consequently are to be looked upon as reflex neuroses. In this connection, the most harmful influence on the urethra and on the prostate is exercised by the gonorrhœal process. A gonorrhœa, which runs a normal course, begins at the orifice of the urethra, and ends at the beginning of the sphincter vesicæ externus. If, however, an abnormal course sets in, if the gonorrhœa extends beyond the isthmus urethræ, then, in the first place, the prostate is involved by sympathy; it becomes catarrhal; and if prostatic catarrh once becomes chronic, then various nervous symptoms gradually arise, now in the urinary, now in the sexual system. Likewise localized hyperæmia occurs, and even prostatic catarrh, around the verumontanum after gross excesses in venery and after masturbation. In this case, through long-continued and too often

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repeated sexual excitement, the congestion of the prostatic urethra and especially of the caput gallinaginis is so long kept up that it has finally become localized there as a chronic affection, and a catarrhal condition of the prostatic ducts, of the sinus pocularis, and of the ejaculatory ducts has established itself. This hyperæmic and chronically inflamed condition of the prostatic urethra sometimes has, as a consequence, a general exalted reflex excitability, a high degree of nervousness, and sometimes we find in men phenomena which usually appear only in intensely hysterical women. Since many women, ill with nervous and hysterical affections, suffer from abnormalities of the uterus associated with cervical catarrh, it will not seem strange to us if men who suffer from chronic congestive or inflammatory processes of the prostate present similar nervous phenomena, especially as the prostate with the utriculus masculinus is, in men, that organ which finds its analogue in the female uterus.

The exact connection between the nervous system and the functions of the urinary and sexual apparatus is still very little understood; yet we know from Eckhard and Goltz that the centres for the nerves which preside over erection, for instance, are to be sought in the lumbar region of the spinal cord. Also the secretion of semen, the action of the vasa deferentia

and of the vesiculæ seminales, are under the influence of the spinal cord.

The prostate and the uterus are both structures very rich in nerves, and they are innervated by one and the same nerve-plexus. The hypogastric plexus of the sympathetic, which is reinforced by filaments from the sacral ganglia and from the pudendal plexus of the sacral nerves, innervates the uterus in women by means of its accessory plexus, the plexus uterinus, and in men the seminal vesicles and prostate, together with the bladder, by means of the plexus vesicalis. In the uterus, according to Kilian, the nerves are found in greater number in the cervix, and according to Klein, we find especially numerous nerve-trunks in the prostate between the sphincter urethræ and the circular striped muscular fibres of the cortical layer, which extend along the urethra, and hold scattered between their fibres numerous ganglion cells. The prostate also contains in its cortical layer ganglia and Pacinian corpuscles, which are elsewhere only present in organs very sensitive and rich in nerves. Since the hypogastric plexus of the sympathetic is in intimate connection with the pudendal plexus of the spinal nerves, and this latter presents a subordinate plexus of sacral nerves, which again, on their side, stand in the closest relation with the lumbar nerves; so, when in organs

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very rich in nerves, such as the uterus and prostate, the peripheral terminations of the nerves are kept in a constant state of excitement by chronic inflammatory processes, it appears very clear that by transmission of this irritation to other nerves in the area supplied by ramifications of the nerves belonging to the plexi mentioned, neuroses of the most varied character may appear in the genito-urinary tract. In like manner worms — *Oxyuris vermicularis*, — eczema, and catarrhal ulcers of the anus produce by transmission neuroses of the urinary and sexual apparatus as well as general reflex excitability.

The pathological-anatomical records in this connection are very scanty. Kaula has collected several autopsy reports, and has found organic changes as follows: sometimes the results of chronic, in part suppurative, inflammation, with ulceration, in the pars prostatica urethræ, which extends to the ejaculatory ducts and the vesiculæ seminales, sometimes changes in the ejaculatory ducts, widening of their orifices and dilatation of their lumen, sometimes strictures, inflammation of the neck of the bladder, total or partial hypertrophy of the prostate, or, on the other hand, atrophy of the prostate (Curschmann).

The URINE in neuroses in general, and especially in those of the genito-urinary system,

offers sometimes such characteristic conditions that an exact knowledge of them materially aids in diagnosis. First of all it is to be noticed that patients who are affected with neuroses not infrequently suffer at the same time with *polyuria*. They urinate often, yet have no pain or inconvenience except that they have to produce so much urine. The urine of polyuria is of a pale straw color, and clear, with a low specific gravity (*urina spastica, nervosa, diluta*). Yet sometimes there is a great quantity of urine without the specific gravity of the urine being diminished in a corresponding proportion. In this case there is at the same time an increased excretion of solids, a diabetes insipidus. This I have observed in a 13-year-old anæmic and excitable boy, who daily passed 7 litres of colorless urine, almost as clear as water, of which the specific gravity was 1.005. The 24-hour quantity of solids amounted to 81 grammes. The patient was always thirsty, and was at any time ready to pass 400 or 500 c.c. of urine. Sugar was not present.

It has been known since Claude Bernard that a puncture in the floor of the fourth ventricle, and, indeed, in a small circumscribed spot between the origin of the vagi and that of the acoustic nerves, produces polyuria, and at the same time glycosuria. It has also been found that certain changes in the central nervous sys-

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tem are accompanied by polyuria and glycosuria.

If the puncture fails to cause glycosuria, there is still usually polyuria. It is not uncommon also to find polyuria in patients who are suffering from an affection of the central nervous system. Lecorché and others have found that in diabetes mellitus there is an increased excretion of nitrogenous urinary constituents, that is to say, an accompanying azoturia or diabetes insipidus; and I have had repeated opportunities to convince myself that the light forms of diabetes mellitus, which can be cured by an exclusive meat diet, excrete considerably more urea and uric acid after the so-called cure than other healthy men; in other words, they still suffer from azoturia. In the case of a diabetic patient who passed in 24 hours 4 litres of urine containing 5 per cent. of sugar, the sugar disappeared in a short time under an exclusive meat diet; yet the 24-hour amount of solids in the urine was 100 grammes, or about one-third more than normal.

Polyuria in neurotic cases cannot always be explained in the same way, still it is generally associated with irritability. By experiments on animals we find, according to Claude Bernard, that after each puncture the abdominal viscera appear highly congested.

Much more seldom we find in nervous trou-

bles a diminution of the amount of urine, that is, *oliguria* and even *anuria*. Anuria in comparatively healthy persons without disease of the kidneys I have never observed but twice, and both times in hysterical women. In these cases I could draw from the bladder with the catheter a very small quantity only of urine; the anuria lasted from one to two days. Benedikt reports such a case in a hysterical woman, which lasted eight days. I have not yet seen nervous anuria in men.

Sugar is not infrequently found temporarily in small quantities and even to the amount of 2 per cent. in the urine of neurotic patients. A patient affected with impotence and general reflex irritability I once found to have transient glycosuria with 2 per cent. of sugar. Further, in several cases after violent mental disturbance a mild glycosuria ensued which lasted days and weeks. I have also not infrequently observed the presence of small amounts of sugar in the urine in chronic brain and spinal diseases. Leudet has found sugar in the urine in the greatest variety of cerebral diseases. Also, after a blow on the head, after certain drugs (curare, morphine), sugar is found temporarily in the urine. A light symptomatic glycosuria, which is usually transient, is a common occurrence in diseases of the nervous system, and the same importance is by no means to be attributed

to it as to diabetes mellitus. I knew an old man who had 3 per cent. of sugar in his urine about ten years ago. He had no other diabetic symptoms, and he visited Karlsbad yearly. Gradually paralysis of the bladder had come on, and three years ago retention of urine suddenly set in. I was consulted at this time, and no longer found any sugar, nor have I since then, up to his recent death (of interstitial nephritis), been able to find any sugar in his urine. In this case the glycosuria appears to have been associated with the development of paralysis of the bladder. That glycosuria of a mild form is also found in diseases of the liver and portal vein is a well-known fact, which need not be considered here.

Very often, in cases of neurosis, the freshly passed urine has a *neutral* and sometimes even a faintly *alkaline* reaction, although the patient may have ingested neither alkalies nor mineral water, nor anything, indeed, which could explain the reaction of the urine. Such a urine is usually of a pale wine-yellow color and clear; and only when the reaction is decidedly alkaline does it seem to have a slightly cloudy turbidity.

Carbonate of ammonia, the ordinary alkali of other alkaline urines, is not present. On the contrary, there is a fixed alkali, generally the carbonate of soda. Cazeneuve and Livon have succeeded in making the urine of dogs alkaline

in every case by dividing the spinal cord in the cervical region. According to Maly, the acid reaction of the urine is brought about by the separation of acid salts in the urinary system (in the renal tubules) by the process of endosmosis, from the alkaline mixture of inorganic salts as found in the blood serum. Yet according to the theory of secretion as taught by Baumann and lately by Heidenhein and Wittich, the renal epithelium is the structure which should separate the fixed constituents of the urine. In accordance with this view it may also be assumed that the renal epithelium is the structure which prepares acid urine from alkaline blood, as indeed is accepted also by Kühne. At any rate the whole secretion of urine, as we have already shown, is under nervous influence; it is no wonder then if in nervous affections, as a rule, a disturbance or change in the secretion of urine is brought about, so that a neutral or even faintly alkaline urine is excreted.

An essential result of the neutral or alkaline reaction is the turbidity which such urines assume on heating, the *earthy phosphates* being precipitated. Heller has already remarked this phenomenon, and has designated it as a characteristic occurrence in diseases of the nervous system. Heller calls these earthy phosphates precipitated by heat "bone-earth" [Knochen-erde], because the precipitation shows a chemi-

cal compound which is presented by the earthy constituents of bone. Phosphoric acid forms with lime and magnesia three classes of salts, according to its basicity. First, acid salts, when one equivalent of acid unites with one equivalent of base; these salts are readily soluble, and are present in all acid urines. Second, basic salts, when one equivalent of acid unites with three equivalents of base; these salts are insoluble, and exist in alkaline urine in the form of an amorphous sediment. Lastly, neutral salts, when one equivalent of acid unites with two equivalents of base; these salts are somewhat less soluble than the acid salts, and are found in neutral urine. If these salts are in solution in neutral urine, the simple warming in a test-tube is enough to precipitate them. If, however, they are in the sediment, they appear crystalline in contrast to the basic earthy phosphates. Since, on heating the urine, albumen is also precipitated, the character of the white precipitate must be shown by the addition of a drop of acetic acid; the earthy phosphates are immediately dissolved, while a precipitate of albumen remains unchanged on the addition of acetic acid. If the precipitate becomes dissolved with an active development of gas, it consists of a mixture of carbonic and phosphatic salts of the alkaline earths; if it dissolves without the production of gas, it consists of phosphates alone.

Sometimes there is an increase of *indican* in the urine in neurosis. In persons who practise masturbation there is sometimes a large quantity of indican found in the urine, and even the emissions of these persons, when dried on their linen, show spots which are bordered with a marked indigo blue or violet color. After excesses in venery, as after sexual excitement in general, we find large quantities of indican in the urine. This is also a common occurrence in nervous and hysterical women. It is well known that in diseases of the central nervous system, especially in cerebro-spinal meningitis, very large quantities of indican are found in the urine (Oppolzer). Indican is usually present in the urine in solution, yet not infrequently indigo is also found in blue and bluish-black scales and flakes in the urinary sediment. In the nitric acid test for albumen the presence of a large amount of indican is shown by a narrow blue or bluish zone resting on the ring of brown coloring matter on the border between the colorless nitric acid and the urine. If this bluish zone is distinctly seen, a beautiful separation of indigo may be obtained by the Jaffe test. Jaffe's test is performed in the following manner: about ten cubic centimetres of urine and an equal quantity of strong hydrochloric acid are mixed together, and to the mixture are added one or two drops of a cold saturated

solution of hypochlorite of lime. The indigo immediately becomes separated, and colors the mixture bluish-black or violet. If now, according to Senator, a few cubic centimetres of chloroform are added, and made to flow through the mixture by repeated shaking of the test-tube, the chloroform takes up the indigo, and is colored a beautiful blue. It is well known that indican appears in the urine in large quantities in diseases of the abdomen (in peritonitis, constipation, incarceration, etc.). I have seen, in a fatal case of peritonitis in the clinic of Prof. Löbel, a urine colored violet by the large amount of indigo, not unlike red wine in appearance and with a deep-blue sediment.

Albumen is also sometimes found in these cases, yet relatively seldom and only in small amount. This mild albuminuria is ordinarily merely transient, and is only found after great excitement, just as it occurs, for example, after an epileptic fit. Albuminuria, indeed, may be produced by injury to the floor of the fourth ventricle, and Coe even maintains that the albuminuria of pregnancy is also only a neurosis of the kidneys. Still, this last opinion is to be accepted with great caution, since, even if this explanation be the right one in certain cases, yet it certainly does not hold in the majority of cases of albuminuria of pregnancy.

The urinary *sediment*, too, in the neuroses is

sometimes very characteristic. *Oxalate of lime* is very often found, and indeed not infrequently in large quantities. The oxalate of lime appears in the form of colorless crystals, usually the quadrate octohedron and its combination with the prism, but not infrequently the diving-bell or hour-glass forms and spheroids of oxalate of lime are seen mixed with the octohedra of

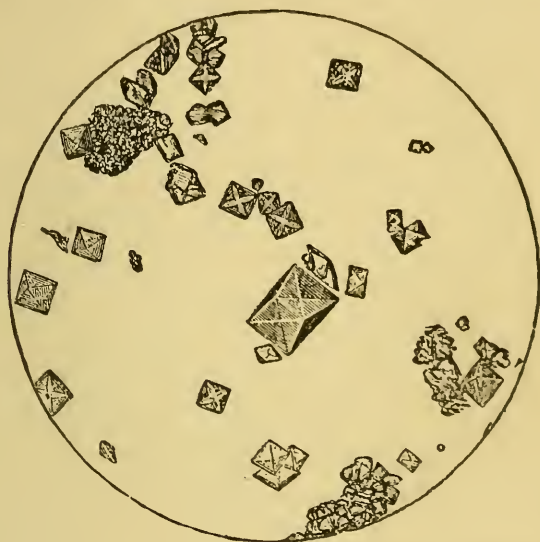


FIG. 1.—Oxalate of lime. 300 diameters.

various sizes. I have seen much oftener and much greater quantities of oxalate of lime in the urinary sediment of cases of neurosis than of renal calculi. I attribute, therefore, much less importance, in the formation of renal calculi, to the oxalate of lime than to the sharp-pointed uric acid. For years together in cases

of neurosis I have seen the heaviest sediment of oxalate of lime without symptoms of beginning renal calculus appearing at the same time (Fig. 1).

Another not uncommon urinary sediment, which appears only as a result of a neutral or faintly alkaline reaction of the urine, consists of amorphous or finely granular *carbonate of lime*



FIG. 2.— Finely granular carbonate of lime and crystalline phosphate of lime. 300 diameters.

mixed with *amorphous phosphate of lime*. The white, finely pulverized sediment is dissolved on the addition of a drop of acetic acid, with the formation, sometimes of few, sometimes of many, bubbles consisting of carbonic acid. Sometimes also, mixed with the amorphous sediment, small, colorless, wedge-shaped crystals

are found, the bases of which appear bevelled; these consist of *crystalline phosphate of lime*. The crystals appear sometimes single, and sometimes so grouped together that several crystals lie side by side with their apices converging to a single point. Moreover, whole rosettes or sheaves are seen, of which the bases of the crystals form the periphery, while the apices unite at the middle point of the rosette or sheaf (Fig. 2). A rare sediment, sometimes found mixed with the crystalline phosphate of lime, is the *crystalline phosphate of magnesia*. This appears usually in the form of long quadrilateral tablets, of which the opposite corners appear rounded off. All these forms of crystalline earthy phosphates are also found in the urine after the ingestion of fixed alkalies or of mineral waters containing such.

Spermatozoa are likewise not uncommon in the urinary sediment of men. They are found in large numbers in the urine in spermatorrhœa, yet single spermatozoa appear also in the sediment in other neuroses of the urinary system (Fig. 3).

Finally, as already mentioned, *indigo* in small blue or bluish-black scales and flakes is found in the urinary sediment. Sometimes indigo is present in such large amount that the sediment appears blue. This, however, is a very rare occurrence. In one case of tabes and paralysis

of the bladder I have had the opportunity for a long time of observing the blue sediment of precipitated indigo; this glaucuria suddenly disappeared. The same patient suffered also with temporary glycosuria with two per cent. of sugar, without simultaneous polyuria or other diabetic symptoms. If at the same time urates, especially urate of ammonia, are present in the

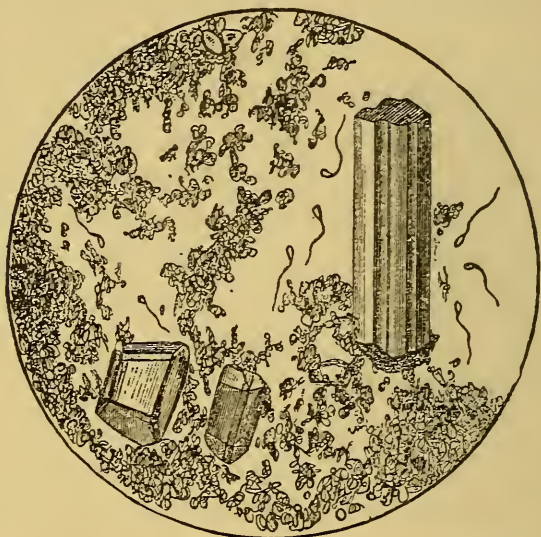


FIG. 3.—Amorphous carbonate of lime, crystalline phosphate of magnesia and spermatozoa. 300 diameters.

urinary sediment, they decompose the indigo, and appear sometimes colored blue, sometimes violet in their otherwise characteristic forms.

The NEUROSES of the URINARY and SEXUAL ORGANS may be divided into three well-recognized groups, according as they affect —

1. *Sensation.*

2. *Motion.*

3. *Secretion.*

Following this order, the neuroses of the urinary apparatus will be treated first, and then those of the sexual organs.

1. (a) The SENSORY NEUROSES which stand in the closest relation to the *urinary apparatus* are sometimes confined to the urethra and bladder alone; sometimes, however, they appear also in the form of cutaneous hyperæsthesia in the vicinity of the urinary organs. In the urethra the patients sometimes feel a troublesome burning, which is especially severe in the pars pendula and about the fossa navicularis. This burning is either constant, or it occurs only during, and for a short time after, micturition. At times the patients complain of an increased sensitiveness, of a feeling of rawness of the urethra (*hyperæsthesia urethræ*). Not infrequently, however, the sensitiveness of the urethra increases to a periodically recurring shooting pain, which, according to the account of the patients, gives rise to a feeling as if a red-hot wire had been pushed into the urethra from behind toward the glans penis (*neuralgia urethræ*). These neuralgic pains often come on during and after micturition; during micturition especially when the penis is slightly compressed with the fingers.

The cutaneous hyperæsthesia is ordinarily confined to the skin of the penis itself and that of the mons veneris. Yet sometimes patients complain of the most varied sensations in the whole abdominal region, in the nates and the thighs; now a burning, stinging, or great tenderness of the skin, again a feeling of numbness and weakness. In some patients there is at the same time an increased general reflex irritability, and these cases often present symptoms which would only be looked for, in such a degree, in hysterical women.

As to ætiology, the patients generally ascribe their trouble to a gonorrhœa which, indeed, has commonly been one of long standing, and accompanied by swelled testicle or inflammation of the bladder. On examination of the prostate *per rectum* nothing abnormal is felt.

The urine shows either no abnormal condition, or it contains one of those constituents which have just been described. Thus not infrequently the earthy phosphates are precipitated by heating. At the same time, also, it is common to find in the urine, in greater or less amount, shreds [Tripperfäden], and especially those thick and short ones, sometimes resembling large-headed nails, which usually come from the prostatic urethra. It is also well known that in the various diseases of the prostate, hyperæsthesia or neuralgia of the urethra

occurs. Thus I have found, at least, the highest degree of sensitiveness of the penis, and especially of the glans, in patients who were affected with a neoplasm in the region of the prostate and neck of the bladder. On examination with the sound a greatly increased sensitiveness is sometimes met with in the prostatic urethra.

Hyperæsthesia and neuralgia of the bladder are common accompaniments of spasm of the bladder, and will be treated of later in that connection, among the motor neuroses.

All these neuroses of sensation, occurring in consequence of gonorrhœa, are generally reflex neuroses, and readily occur in connection with catarrhal prostatitis. The expulsion of numerous thick and short shreds with the very beginning of micturition, and the absence of even the least secretion from the urethra (*goutte militaire*), make it certain that the diseased portion of the urethra is in the region of the external sphincter; consequently in a place which is ordinarily closed by muscular action, and is only opened during micturition. Improvement therefore ensues forthwith when the *pars prostatica urethræ* and the prostate itself are subjected to local treatment. Next to warm sitz baths and full baths, enemata of warm water or camomile tea, at a temperature of 28° Réaumur [95° Fahr.], twice or three times daily, will prove

most efficient in connection with local treatment of the prostatic urethra. This latter should be so carried out that, by means of instruments, astringents and even nitrate of silver are introduced into the prostatic urethra.

I usually employ in the local treatment of the prostatic urethra a short, metallic catheter (Fig. 4), which I have had made for this purpose. The catheter is 16 cm. long, and has a calibre of Charrière No. 16. The vesical end has the ordinary curve of the metallic catheter, is smoothly rounded, and is perforated like a sieve. The outer end is furnished with a round plate and a piece of rubber tubing (Fig. 4). The catheter is introduced to such a depth that its point is just within the membranous portion of the urethra (consequently anterior to the prostate). The disk prevents the catheter from slipping in more deeply, and at the same time serves to close the external meatus. A mark on the disk shows always, in introducing the catheter, the direction of the vesical end. The catheter having been in this manner introduced into the membranous urethra, an ordinary syringe, containing 100 grammes of fluid, is attached to the tubing on the end of the catheter, the latter is steadied with the left hand, and the whole contents of the syringe is slowly and with gentle pressure driven through the prostatic urethra into the bladder. If the end of

the catheter is in the membranous portion, all the fluid can be injected through the prostatic urethra without difficulty, since the catheter is already partly within the external sphincter, which therefore offers no resistance. If the point of the catheter, however, reaches only the bulbous portion, then the fluid cannot be driven through the prostatic portion even under strong pressure; it will either flow out beside the catheter, or will painfully distend the urethra. These injections through the prostatic urethra should be given once every day, or, at least, every other day. For the first and second injection I use 100 grammes (a syringe full) of a 1-4 to 1-2 per cent. solution of carbolic acid, then I change to a 1-2 per cent. [sulphate of] zinc solution; and, as soon as the patients bear the injection well, I increase

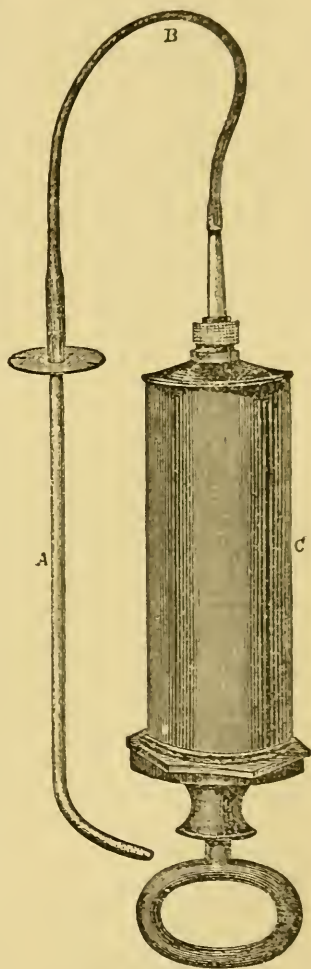


FIG. 4. — Ultzmann's Syringe-catheter.

the strength gradually to a 3, 4, and 5 per cent. zinc solution. I have the patients empty the bladder before and after each injection. I have also used tannin solutions of 1-2, 1, and 2 per cent., but have found the zinc solutions, or zinc and alum together, much more efficient. Similar instruments have been used before for the same purpose, as by Guyon and recently by Gross.

The patients begin to feel better after a few injections, and later they urgently crave the injection each time. Especially excellent is the effect of the injections in those nervous men who behave like hysterical women. Thus not infrequently men are met with who, after a long-continued gonorrhœa, especially when complicated with swelled testicle or catarrh of the bladder, become moody and melancholy, have no desire for daily work, which before was a necessity for them, complain of a feeling of weakness in the legs, and various sensations in the hypogastric region and the genitals, and suffer at the same time with frequent and painful micturition, emissions, impotence, and other such symptoms. The patients immediately begin to improve under the local treatment carried out as described. After a few injections the lost energy returns, the patients feel their trouble disappear, and become again gradually in every respect capable of performing their functions.

(b) The *sensory neuroses* of the *sexual apparatus* are confined, now to a sensitiveness of the testicle and spermatic cord, now to a dragging and stinging sensation in the testicle (*neuralgia testis*), that comes on periodically. Sometimes there is a painful sensation in both groins or a stinging pain in the urethra during and after the ejaculation of semen. On examination with the sound the urethra is found sensitive throughout, but especially in the prostatic portion, where the pain may attain such a degree that the patient screams aloud, and gnashes his teeth.

A diminished sensibility of the urethra, as also of the skin of the penis and scrotum, is not uncommon, and is sometimes met with in an extreme degree in that form of impotence which is designated as nervous.

By *impotentia coeundi* is meant the impossibility of consummating the normal act of coition. The explanation of this condition is to be sought either in an organic change, a malformation, a defect of the penis, or, the penis being healthy and normally formed, in the inability to have a lasting and powerful erection. In the first case we have to do with an organic, in the second with a nervous or psychical impotence. Certain drugs may cause temporary impotence, and in chronic diseases of the brain and spinal cord, as also in diabetes mellitus, even permanent

impotence may occur; that form of impotence only is here under discussion which occurs most frequently, and which, as already mentioned, is known as nervous or psychical impotence.

This form of impotence usually occurs in young men, and, indeed, in those who either suffer or have suffered from emissions or spermatorrhœa, and who have been for a long time addicted to masturbation. This form of impotence may be relative, or it may hold in the same degree in all cases. By relative impotence is understood the inability to consummate the sexual act with certain individuals, while with other persons, prostitutes, for instance, it succeeds very well. This state of things occurs not infrequently among married people who have an aversion for each other. In one case, in which the wife sued for divorce on account of the impotence of her husband, I was able to convince myself that the husband was in a condition to have normal sexual intercourse at any time with other persons. Moreover, it is commonly the case in nervous impotence that the subjects, when they are alone, and give themselves up to lascivious thoughts, or when they awake from sleep at night, have powerful and lasting erections, while the same persons, when it comes to actual intercourse, can get no erection at all. It also not infrequently happens, that when in coitus there is an erection at first,

it is too weak and of too short duration, and the ejaculation of semen takes place too soon, — that is, *ante portas*. Sometimes an immissio penis is still possible when the vagina is large, but the penis soon becomes completely flaccid, and no emission follows; the coitus is incomplete and unsatisfactory.

The ætiology of this form of impotence, as already mentioned, is to be found in masturbation and other unnatural sexual excesses. The persons affected so accustom themselves to these extraordinary means of sexual gratification that, when they attempt normal coitus, they are no longer successful. Still there are individuals who have been guilty of little or no sexual excess, and who are nevertheless affected with nervous impotence. These are either persons who, in consequence of an inherited nervous predisposition, and as a result of exhausting mental or physical exercise, have brought their nervous system to a high degree of tension, or persons who, through sudden fright, great pain, etc., have sustained a severe shock to the nervous system. Thus I have repeatedly had patients under observation who, after the loss of young and much-beloved wives, have become suddenly impotent, although, according to their own account, they have formerly been in a high degree potent. I have also often seen temporary impotence ensue in cases of great loss of money and property.

This form of impotence can best be explained by considering the nature and origin of erection. According to Köl liker and Kohlrausch, erections are brought about in the following manner:—Under the influence of the *nervi erigentes* the organic muscular fibres of the cavernous tissue become relaxed, and the interspaces thereby enlarged and made ready for the reception of a large amount of blood. There is still a second factor of great importance, and that is the prevention of the back-flow of the blood out of the corpora cavernosa. This damming of the back-flow is probably accomplished by the following muscular apparatus. Along the *pars subpupica urethræ* lies the *musculus bulbo-cavernosus* which begins behind in a tendon from which also the *musculi transversi perinæi* and the *sphincter ani externus* take their origin. The muscular fibres are arranged on either side like the plumes of a pen, and project above like the prongs of a fork. The ends of this muscle merge in a thin aponeurosis which is continuous on the dorsum of the penis with the tendons of the *musculi ischio-cavernosi* (Linhart). When this muscular apparatus contracts, the penis in the region of the symphysis is constricted, and the return of blood prevented; at the same time also (probably through the influence of the *musculi ischio-cavernosi*) the penis is raised, *i.e.*, erected.

When this constriction of the penis by muscular action against the symphysis is incomplete, and on that account the erection is too feeble, incomplete, or of too short duration, it is well known that voluptuaries, in order to strengthen this muscular action, place about the root of the penis a constricting ring of rubber or other material.

This mechanism of erection is essentially under the influence of the nervous system. According to Eckhard, erections can be excited in dogs by electrical irritation of the brain as well as of the cord, and, indeed, we find in men also that libidinous thoughts as well as certain diseases of the central nervous system have erections as a result. Peripheral excitation of the genital apparatus also causes erections. Thus it is commonly found that with a full bladder erections occur more easily, and last longer than with an empty bladder. It is also well known that during the night, in the dorsal position, the pressure of a full bladder on the returning blood-vessels is sufficient to excite powerful erections. We know, too, that inflammatory irritation, as in prostatitis and inflammation of the seminal vesicles, serves to produce constant, indeed very painful, priapism. And, finally, it is well known that peripheral irritation applied to the glans penis, the skin of the penis, and the testicles, causes erection.

Goltz has discovered that, for the excitation of erection through peripheral nerve-irritation in dogs, it is brought about more promptly and powerfully when the lumbar portion is divided from the rest of the cord. He concludes from this that the influence of the inhibitory cerebral nerves over the erection is thereby eliminated.

Nervous or psychological impotence may therefore be dependent on the increased action of the inhibitory nerves brought about by unpleasant, strongly agitating, excitement of the brain. Through the action of these inhibitory nerves the organic muscular fibres of the corpora cavernosa will contract and oppose an obstacle to the entrance of the blood into the cavernous tissue. Indeed, patients are not infrequently met with in whom, when they are not in a state of sexual excitement, the penis is shrivelled and moves itself in a worm-like manner, which might well be due to the action of these organic muscular bands in the corpora cavernosa. Examination usually shows the penis of such persons to be small, retracted, and with the skin wrinkled on the dorsum.

The testicles are usually normal, indeed sometimes even strongly developed, and it would certainly be a mistake to draw any general conclusions as to increased or diminished sexual power from the size and consistence of the testicles, since often, as is well known, patients in

whom the function of the testicles in coition is wholly lost through obliteration of both vasa deferentia after gonorrhœal epididymitis, may yet be very potent.

The skin of the penis is frequently found very insensible to electrical stimulation, and there is also commonly a very different degree of irritability of the skin on the two halves of the entire genital apparatus. According to Benedikt, the right half is physiologically more sensitive than the left, yet I have not infrequently found the condition reversed. It is also common to find that the before-mentioned muscular arrangement, which acts by preventing the return flow of blood from the corpora cavernosa, reacts only feebly to electrical stimulation. Since this is the same muscular apparatus which throws the semen out of the urethra, the declaration of patients that the semen during coitus is no longer thrown out as powerfully as formerly, but that it only flows out sluggishly, is explained. If in healthy men a rectal electrode be introduced into the rectum, and an ordinary sponge electrode as the second pole placed over the bulb of the urethra on the raphe of the perinæum, such powerful contractions of this muscular apparatus can be brought about under normal conditions by the use of the induced current that the perinæum bulges out, and the hand holding the electrode feels a strong im-

pulse. Now in impotence I have not infrequently found that these contractions of the muscular apparatus, even with the use of strong currents, are produced only incompletely, and are scarcely perceptible.

The prognosis in psychical or nervous impotence is usually favorable. Since the genitals are otherwise normally formed and functionally capable; since also, usually, powerful erections occur, although always at the wrong time; and since just at that time when there is a strong desire for an erection it is wanting, so the treatment of the patient must be, above all, psychical. The influence of the excited cerebral activity over the inhibitory nerves of erection must be overcome, then the patient will again be potent. Ordinarily we have to do with abnormally excitable, so-called nervous patients, who enter upon coitus with powerful erection, but extraordinary excitement, yet before the beginning of the act the penis has already drooped, and its introduction becomes an impossibility. Such a failure so discourages the patients that, if it is repeated, they abstain from any further trial from a feeling of shame, and regard themselves as impotent. In such cases the comforting advice of the physician with the assurance of complete cure has a very quieting effect on the abnormally excited mind, and not infrequently the physician sees such

often despairing patients depart with tears in their eyes and with the most sincere expressions of gratitude.

If then the physician has, in this manner, won the confidence of his patient, the latter also is much more composed, and the further treatment is made more practicable. Should evidences of strong excitement be apparent notwithstanding, bromide of potassium might be given in large doses (3 grammes a day), or a quieting cold water cure be prescribed with advantage.

Local treatment, however, is always the most effectual. This may be either electrical or mechanical, instrumental. It is well known that through the application of irritants in the rectum or in the prostatic portion of the urethra erections can be produced. Thus, after the administering of enemata, or when sounds are allowed to remain in the urethra, very powerful erections not infrequently occur. The object of treatment must be to make it clear to the patient that he is not impotent, and that he is in a condition to have lasting and powerful erections. When the patient has once convinced himself of this, then the relief of his impotence offers no further difficulties. The point is therefore to secure to the patient unexpected erections. This was attained by Benedikt, Schulz, and others by means of the con-

stant current with good result. Weak currents were usually employed. The copper pole is placed over the lumbar vertebræ, and with the zinc pole the perinæum, spermatic cords, and penis are successively stroked. Duration of daily sitting, 2 or 3 minutes; duration of treatment, 6 to 10 weeks. In obstinate cases Benedikt employs a urethral electrode which he unites with the zinc pole, and introduces into the prostatic urethra. This proceeding, however, by the use of the constant current, is only a galvanic cauterization of the pars prostatica by means of the caustic alkalies of the tissues (caustic soda?), since, according to electrical laws, the alkalies are set free at the zinc pole. Although these methods are capable of producing excellent results, yet I employ the faradic current, following the experience of Duchenne, with this modification, that one pole, a metallic staff about 6 cm. long, is placed in the rectum. With this pole in the rectum the other electrode is applied successively over the bulb of the urethra, and right and left over the ascending rami of the pubes. In this manner contractions of the musculus bulbo-cavernosus and of the musculi ischio-cavernosi are produced, consequently of that muscular apparatus which favors the erection of the penis, and promotes the ejaculation of the semen. If there is at the same time anæsthesia of the skin of the penis and its sur-

roundings, or if diminished sensibility is evident, then I stroke also, occasionally, these parts, whereupon the normal sensibility directly returns. This method of treating impotence is not infrequently accompanied by the most excellent results, only it has its shady side, and that is that nocturnal emissions are promoted, *i.e.*, increased. When, therefore, frequent pollutions are at the same time present, this procedure is not especially to be recommended, since, to use a simile, we should only be stopping one hole with another. Fortunately, however, this form of impotence is rarely complicated with frequent pollutions; much oftener with spermatorrhœa, a frequent, sometimes almost continual, flow of semen without accompanying sexual excitement and erection. But when spermatorrhœa is present, the faradic treatment not infrequently works so far favorably that it changes the almost continual flow of semen into a periodical emission with erection and voluptuous sensation, *i.e.*, into nocturnal pollutions.

The local treatment by means of bougies or other catheter-formed instruments is likewise generally successful when frequent pollutions are coexistent, or when other phenomena, such as neuroses of sensation or motion, are evident in the region of the prostatic urethra. In such cases, which are wont to ensue after venereal excesses of high degree, or which are engen-

dered by masturbation, it is very probable that a pathological change of the caput gallinaginis is involved. This form of impotence must consequently be looked upon as a reflex neurosis emanating from the prostate, and is to be treated accordingly. There are also those obstinate cases which, according to Benedikt, only improve after the application of the catheter-electrode. If the cause of the neurosis is sought in the caput gallinaginis, then the local treatment of the prostatic urethra is at least the most rational procedure. To this end the mildest treatment appears to be the introduction and leaving-in of wax or flexible rubber bougies. More powerful is the action of thick and heavy metallic sounds which stretch the urethra, and exert a pressure on the caput gallinaginis. In the same way, also, the cold sound (psychrophor of Winternitz) works very advantageously, while here to metallic pressure cold is added. Should all these means be of no avail, then a mild cauterization of the caput gallinaginis with nitrate of silver might be tried. All these methods will be treated of more in detail under the head of pollutions and spermatorrhœa.

The use of the so-called aphrodisiacs, as cantharides, phosphorus, and other remedies, I consider harmful. Just as injurious I regard all apparatus and rubber rings which are placed about the root of the penis for the purpose of

producing more powerful and lasting erections. Tonics, such as quinine and iron, a cold water cure, sea-bathing, mountain air, are useful, and especially to be recommended as after-treatment.

2. (*a*) The MOTOR NEUROSES of the urinary and genital system appear sometimes in the form of spasmodic contractions, and again in the form of paralysis. In the *urinary system* we find these forms best defined in the bladder, which is the most muscular organ.

In the urethra these phenomena are not very distinctly defined. Yet there is a peculiar condition which might be attributed to spasm of the organic muscular fibres of the urethra, which sometimes worries patients very much, and brings them to the physician, namely, the more or less profuse *dribbling of urine* after micturition. The patients complain to the physician that after they have completely emptied the bladder, have allowed the penis to drain off, and have replaced it in their trousers, they feel suddenly, on taking a few steps, sometimes a few drops, and again a larger quantity of urine flow from the penis, and sometimes the trousers are wet through down to the knee. This phenomenon, I believe, may best be explained by supposing this small quantity of urine to have remained behind in the urethra. The retention of the urine in the urethra is

favoured by the contraction of the organic muscular fibres by which the canal is narrowed, and its walls made more resistant. Now, as long as this contraction of the organic muscular fibres lasts, the urine stands, as it were, in a tube with rigid walls. It can no more flow out than a fluid out of a glass tube of which one end is closed. As soon as relaxation of these organic muscular fibres ensues, then the contents of the urethra trickles out, just as a fluid out of a tube with thin and soft walls, as, for instance, a gut filled with water with one end tightly closed. This so-called dribbling of urine, therefore, should be attributed to a spasmodic contraction of the organic muscular fibres of the urethra throughout its whole length.

Much more important and noteworthy is spasm of the external sphincter of the bladder, the *spasmus sphincteris vesicæ*. It shows itself in this way, that the patients complain of having a frequent impulse to urinate; but when the call comes they can only satisfy it with difficulty. Sometimes they have to wait and strain five or ten minutes before any urine comes, and then the urine does not flow with its normal force, but at first by drops, then in slight spurts, and finally in a full stream. At the end of micturition the stream again becomes thinner until the urine flows only by drops, and then after the penis has been re-

placed in the trousers, there still flows a small additional quantity of urine. They also complain that they are often entirely unable to urinate, although they have the desire, and that they have to depart from the closet without having effected their purpose. The mildest degree of spasm of the sphincter is the phenomenon, common with certain persons, mostly very nervous individuals, of not being able to urinate in the presence of a second person. Sometimes they cannot pass water in a urinal if any one happens to be near. This spasmodic contraction of the sphincter, however, is not always of so harmless a nature. Sometimes it is so violent as to lead to retention of urine. I distinctly remember a case in which micturition was each time only made possible by the injection of a large dose of morphine. The patient also could only urinate in a sitting position, and while defecating. The urethra was so sensitive that examination with the sound could only be made under anæsthesia; but it could then be made with ease. Spasm of the sphincter of the bladder has been the occasion of many mistakes. Since there is, in fact, an obstacle to the passage of urine, there was formerly thought to be either disease of the prostate or a stricture. In early times, when strictures were classified in the broadest sense, there was, besides the inflammatory stricture, also a nervous or spasmodic stricture. Now

this spasmodic stricture is always a spasm of the external sphincter of the bladder. The cause of this spasmodic stricture is generally a diseased condition of the prostatic portion of the urethra or of the prostate itself. The funnel-shaped sphincter, which represents the prostatic and membranous portions of the urethra, contracts spasmodically when sources of irritation have localized themselves within its limits. We find as an analogue spasm of the sphincter ani in cases of catarrhal ulceration or fissure, indeed even in simple inflammation of the rectum; it is therefore no wonder that we have spasm of the sphincter vesicæ with similar affections at the neck of the bladder, especially when reflex spasm of the sphincter of the bladder may be brought about by irritation in the rectum. Such irritation localized in the prostatic urethra may be the result of gonorrhœa or of masturbation. Of gonorrhœa, when a prostatitis catarrhalis gonorrhœica is present and we find its traces in the thick-headed shreds contained in the urine. Of masturbation, when we find, on examination with the sound, that the prostatic urethra is very sensitive, and bleeds easily without there being evidence of any inflammation or gonorrhœa; since we may then assume that in the prostatic urethra, probably about the caput gallinaginis, hyperæsthesia, hyperæmia, even a catarrhal condition with superficial ero-

sion of the mucous membrane, has become localized.

The examination with the sound is sometimes attended with great difficulty, and demands a practised hand. It is best to use in the examination a cylindrical metallic sound of the greatest possible thickness and with a well-rounded point. With soft instruments the object is not attained, for they become bent in the membranous portion. Thin instruments, especially small metallic catheters, never serve the purpose and are absolutely dangerous, because by some carelessness they may easily cause injury and make false passages. Having selected a suitable metallic sound, it is passed, held as lightly as possible between the thumb and forefinger, with a steady, gradual movement down to the triangular ligament. Here it is held, and the blunt point of the sound is pushed gently and firmly against the isthmus. After waiting a few moments the contraction of the sphincter is gradually felt to relax, and the sound can be easily passed into the bladder. If the catheterization be done roughly, and the sound, arrived at the isthmus, be thrust about here and there, because we cannot reach the bladder, the sphincter is only stimulated to renewed spasmodic contraction, and the instrument cannot be made to pass through. One easily explained result of this difficult catheterization is the diagnosis of

urethral stricture made by unskilful physicians when there is only a spasm of the sphincter. We also find in literature cases reported as curiosities, in which surgeons, assuming stricture to be present, proceeded to do external urethrotomy, and then to their great astonishment were able, during anæsthesia, to pass very large instruments into the bladder.

The treatment must, above all, be directed to making the sphincter penetrable for catheter-formed instruments. This is best accomplished by the daily passing of large metallic sounds, allowing them to remain in from 5 to 15 minutes and over. This practice alone is ordinarily sufficient to establish normal micturition. In certain obstinate cases, however, especially when erosions or fissures at the neck of the bladder are suspected, the prostatic urethra must be cauterized with nitrate of silver by means of the *porte-remède*.

Much more frequent is the true spasm of the bladder, *cystospasmus*, which is accompanied by vesical tenesmus, and which must properly be considered as a spasm of the detrusors of the bladder.

The *spasmus detrusorum vesicæ* occurs in diseases as well as irritability of the central nervous system, and also as a reflex neurosis in anomalies of the urethra, especially the prostatic portion. Frequent micturition is common with

strong mental emotions, such as dread and fear, especially in such individuals as are of a congenitally nervous temperament. It also commonly occurs in persons who by overstrained physical or mental activity have brought their nerves into a condition of exaggerated excitability. We likewise find vesical tenesmus after drinking large quantities of fluid, especially when it acts as a diuretic on account of the large proportion of carbonates or of free carbonic acid contained in it. It is not infrequently the case, also, that masturbation and venereal excesses in general, through which unnatural erections are maintained for a long time, bring about hyperæsthesia, hyperæmia, and mild catarrh of the pars prostatica, and especially of the caput gallinaginis, on account of its enforced swelling; and thence arises reflexly increased contraction of the detrusors. It is well known that even after normal coitus one is sometimes constrained to urinate more often than at other times. Further, we find not infrequently, after a gonorrhœa which has run its course and has been complicated with epididymitis and prostatic symptoms, that spasmus detrusorum ensues. Even so, sometimes when the urine is concentrated and rich in uric acid, although otherwise normal. Spasmus detrusorum is also sometimes excited by diseases of the rectum (fissures, catarrhal ulcerations,

etc.), yet under these circumstances spasmus sphincteris vesicæ, as already mentioned, is much more frequently found.

Accordingly, by spasmus detrusorum we understand a frequent, although generally painless, impulse to urinate. This impulse to urinate occurs, for the most part, only by day, that is, when physical or mental activity begins. In the night there is usually not the least need felt to urinate, so long as the patients quietly sleep; when, however, they pass a sleepless night the vesical tenesmus is all the stronger. The desire comes sometimes hourly, again every 10 or 15 minutes, and is sometimes so violent that when the patients do not hasten to the closet the urine flows into their clothes against their will. This state of things is consequently just the opposite to that described in the case of spasmus sphincteris vesicæ.

The urine is usually clear and of a pale yellow color. It has a low specific gravity and a neutral or faintly acid reaction. There is simultaneous polyuria (*urina spastica, nervosa*). Not infrequently the urine is turbid and alkaline without there being any sign of catarrh of the bladder, and without any alkali, or mineral water containing such, having been taken internally. In such cases, since an alkaline and therefore abnormal urine is secreted without evident cause in the kidneys, we must as-

sume a perversion of the normal urinary secretion, and consider this urine as the result of a coexisting secretory neurosis of the kidneys. If the urine shows with litmus paper a neutral or faintly acid reaction, we find, on heating, that turbidity which completely dissolves on the addition of a drop of acetic acid and which consists of neutral earthly phosphates. The demonstration of these neutral earthly phosphates in connection with the neutral reaction of the urine essentially supports the diagnosis of neurosis of the urinary and sexual system in general, and here especially of nervous frequency of micturition, cystospasmus. We also find sometimes one or another abnormal urinary constituent in solution or in the urinary sediment, which has already been discussed under the head of "Urine in Neuroses." If the spasmus detrusorum has occurred as a result of gonorrhœa, we find usually those short and thick-headed shreds in the sediment which come from the prostatic urethra.

On examination with the sound the urethra and bladder are found very sensitive, the prostatic portion being recognized as the most sensitive spot. The negative result of the examination with the sound and the normal condition of the urine, or the appearance of neutral phosphates on boiling, together with the neutral

reaction of the freshly passed urine, establish the diagnosis of cystospasmus. If short, thick shreds are also visible in the urine, then the opinion gains probability that we have to do with a cystospasmus which has come about as a reflex neurosis from the pars prostatica urethræ.

The treatment has, in this case, varied conditions to fulfil. If we have to do with a cystospasmus which is dependent on irritation of the central nervous system this harmful influence must first of all be wholly removed. Such a patient must withdraw himself for a time from overstraining mental occupation; likewise when sexual excesses have been the cause of his difficult micturition, or when other harmful influences in general, such as pain and fear, have produced a permanent effect. In such cases sometimes a pleasure journey does excellent service, and sometimes a stay in the country, a mild course of cold-water cure, sea bathing, or warm baths at Römerbad, Gastein, Teplitz, etc. If all these things are impracticable, agreeable recreation and diversion must be provided for as much as possible. Of internal remedies, bromide of potassium in large doses (3 or 4 grammes daily) works best, or quinine, iron, and arsenic in ordinary doses. Morphine or some other narcotic will temporarily relieve the severe vesical tenesmus, and is best given in the form of a suppository.

If, on the other hand, we have to do with a cystospasm which may be attributed to masturbation, venereal excesses, or gonorrhœa, then the local treatment of the pars prostatica must be undertaken. In such cases passing sounds is effectual, or treatment with astringent by means of the short urethral catheter (as described on page 29), in connection with warm clysters and warm baths.

Among the motor neuroses of the urinary system, and especially of the bladder, which are accompanied by diminished power of contraction, are to be mentioned paresis and paralysis of the sphincter and also of the detrusors of the bladder. Paresis of the sphincter is frequently associated with incontinence of urine, and paresis of the detrusors not uncommonly with retention of urine.

By *paresis of the bladder* is to be understood the inability to completely empty the bladder. *Paresis of the detrusors* is usually meant by this expression. A tardy evacuation of urine occurs sometimes in otherwise normal men. Thus I have several times observed cases in which the urine was evacuated only twice in 24 hours. One patient in particular, a strong young man, apparently never had a pressing desire to urinate, and said that he urinated only in the morning and evening, and then more from habit than from a desire to re-

lieve himself. He could, so he said, hold out very well for 24 hours, urinating only once. Once when he came to me he declared that he had not passed urine for 20 hours. I had him urinate forthwith, and after some straining and delay he passed about a litre of normal urine. The bladder was distinctly to be felt over the symphysis. The patient complained only of difficult and infrequent urination in general. I prescribed mineral waters containing soda salts, massage of the bladder, cold douches on the lumbar region after a warm bath, and micturition at least 5 times in 24 hours. The patient must, whether he had desire or not, go to the closet every 4 hours and pass his urine. In this way the patient was in a short time so far restored that he could urinate 4 or 5 times daily, in a normal manner and without straining.

Paresis of the detrusors is either dependent upon organic change of the muscular fibres (hypertrophy, fatty and amyloid degeneration) or it is a question of motor neurosis. The inability to completely empty the bladder is best verified by having the patient empty his bladder as much as possible and then immediately passing a catheter. A bladder, to be normal, must empty itself completely, so that not a drop of urine can be obtained with a catheter. If the spontaneous emptying of the bladder, however, is insufficient, it will be possible always

to evacuate with the catheter a greater or less quantity of urine. The amount of urine thus evacuated will be a measure of the insufficiency of the bladder. The more residual urine there is to be drawn with the catheter, the weaker usually are the detrusors of the bladder. I say usually, because there are cases in which the evacuation of urine is insufficient on account of some mechanical obstruction. Such obstructions are generally strictures of the urethra, chronic prostatitis, and hypertrophy of the prostate. In such cases, hypertrophy of the muscular coat of the bladder is also found as a complication. If, however, there is no such mechanical obstruction to the passage of urine, we have as a rule to do with paresis or paralysis of the detrusors.

The patients usually complain that they urinate very badly. Before each act of micturition, which is indeed painless, they have to wait a long time, pressing and straining, until the urine comes, and even when it comes it does not flow in a bow-like stream, but falls without force perpendicularly from the urethra, just as rain-water trickles from the roof. While lying down they cannot urinate at all, and standing the urine flows best if they lean forward and press on the abdomen. The more incomplete the evacuation of urine is, the oftener comes the desire to urinate, yet there is never a feeling of satisfaction after urinating. If the paresis pass

gradually into paralysis, incontinence occurs at first during the night, and after some time gradually becomes constant. The patients have a feeling of fulness in the hypogastrium, they urinate very often, and each time only a small quantity of urine is passed by resorting to abdominal pressure; yet the urine still flows constantly by drops. They never again have the feeling of satisfaction after urination.

Paralysis of the bladder is generally found in chronic cerebral and spinal diseases. Yet it occurs also in the various acute febrile processes when they are complicated with affections of the central nervous system, but it is then for the most part temporary. In advanced age insufficiency of the evacuation of urine occurs almost as a rule, although well-pronounced paresis is not always apparent. In youth and in vigorous middle life a parietic condition of the bladder, especially of the detrusors, occurs in such individuals as have retained their urine for a long time, or in such as suffer from spastic contractions of the vesical sphincter as a result of venereal excesses or of masturbation. That, in cases of prostatic enlargement and of stricture, or other permanent obstructions to the evacuation of urine, hypertrophy in the beginning and later paresis of the detrusors of the bladder becomes established, has been already mentioned.

Sometimes, in certain clinical cases, we can recognize very well the two following forms of paresis and paralysis of the bladder, namely, on the one hand when the sphincter, and on the other when the detrusors, are paralyzed. In paralysis of the detrusors incontinence is usually found only in the more advanced stages; for, since the sphincter is closed, the urine first begins to dribble only after the bladder has become distended to the maximum, just as a vessel filled to the brim must overflow when still more fluid flows in. In paresis of the sphincter, on the contrary, we have incontinence very early, because the closure of the bladder has become defective. Incontinence in this case begins usually by day, because in the erect position of the patient the weak sphincter is much more easily overcome by the volume of urine pressing on it from above, than while lying in bed. Further, in paresis of the detrusors retention of urine sometimes takes place, which does not occur in paresis of the sphincter. If, namely, a great volume of urine collects in the bladder, as can only happen in paresis of the detrusors, it thus forms a heavy mass which obstructs the circulation of blood in the prostate and about the neck of the bladder in general. Hence ensues an œdematous swelling of the prostate and retention of urine is brought about.

On examination of the patient the differential diagnosis is sometimes much easier still to establish. If the detrusors alone are parietic, and the sphincter still works efficiently, the bladder is found distended, as a fluctuating tumor over the symphysis, or else a flaccid bag filled with fluid is felt, which, being compressed with the hand, causes a desire to urinate. It is also possible, in spite of the patient's declaration that he has just urinated, to demonstrate by percussion several finger-breadths of dulness over the symphysis. In paresis of the sphincter the spherical form of the distended bladder is never felt over the symphysis. The sphincter is to such a degree weakened that it is not in a condition to offer resistance to a large accumulation of urine in the bladder; the urine flows away involuntarily. Consequently large quantities of urine are very seldom found; indeed, in some cases it is impossible to show over the symphysis any distention of the bladder with accumulated urine. If we pass a catheter into the bladder, we usually meet, in paresis of the detrusors, a powerful resistance at the neck of the bladder, whereas in paresis of the sphincter, meeting no resistance, we almost fall with the instrument, figuratively speaking, into the bladder. If the urine be drawn off, a larger quantity will usually be found in paresis of the detrusors than in paresis of the sphincter. Yet not infrequently

paresis of the detrusors is complicated with paresis of the sphincter, so that these typical phenomena are no longer capable of demonstration. When the urine flows through the catheter, the patient being in the horizontal position, we notice at the beginning of the flow a relatively powerful stream; soon, however, it diminishes, and the urine flows down perpendicularly and in a weak stream from the end of the catheter. Only by the impulse of coughing or by pressure on the belly is a more powerful and bow-formed stream caused, which, however, immediately becomes weak and powerless again. Finally the urine stops flowing entirely, yet if we press with the flat of the hand on the fundus of the bladder, or have the patient get up and gradually assume the upright position, then the urine still flows from the bladder in greater or less amount.

The urine is either normal, or it shows a neutral or faintly alkaline reaction, with a precipitate of neutral earthy phosphates. Sometimes the urine has been from birth turbid and alkaline, without there being an accompanying catarrh of the bladder. The turbidity and the whitish sediment consist merely of earthy phosphates. In the sediment are found either the amorphous or the granular carbonate of lime, the crystalline phosphate of lime, and sometimes even phosphate of magnesia crys-

tallizing in long, rectangular plates. Occasionally I have also found sugar, to the amount of 2 per cent., in paresis of the bladder, without there being in addition any of the general symptoms of diabetes. The sugar, moreover, after being present months and years long, has subsequently disappeared completely from the urine without anything having been done for the glycosuria. If, however, the stagnation of urine in the bladder continues for a long time, a purulent catarrh of the bladder or a purulent cystopyelitis gradually comes about, and in the urine as well as in the sediment are found the characteristic evidences of these affections, such as albumen and carbonate of ammonia in solution, and in the sediment pus corpuscles, crystals of ammonio-magnesian phosphate, bladder and renal epithelium. This purulent catarrh of the bladder occurs very easily when the bladder has been previously examined with a sound or other catheter-formed instrument.

The prognosis in paralysis of the bladder is not very favorable, and in most cases the urine must thenceforth be constantly drawn with the catheter. This must be explained to the patients, else they will unnecessarily blame the physician for having, by catheterization, reduced them to such a condition that they are no longer able to pass their water spontaneously, as was still possible, they say, before the use of the

catheter. The greater the amount of urine which can be drawn from the bladder with the catheter, the more unfavorable is also, usually, the prognosis, as regards the contractility of the bladder. During the subsequent catheterization, also, inflammatory processes are not infrequently set up in the urinary tract, which may even be capable of immediately threatening the life of the patient.

The older expressions which were formerly used in connection with the motor neuroses of the bladder, such as *incontinentia urinæ*, *strangury*, and *ischuria*, I have not here made use of, since they are only general diagnostic terms, and are often used in entirely different morbid conditions. Nevertheless the etymology of these expressions, which are still sometimes employed, should be briefly reviewed. By *incontinentia urinæ* (from *in* privative and *contineo*, to hold together, hold fast) is understood the inability to hold back the urine. That this condition may occur in the most varying affections of the urinary apparatus, is clear. By *strangury* (from *το οὔρον*, the urine, and *σπραγγω*, I press, urge, strain) is understood a straining at micturition, when the urine comes only by drops and with great pain. Finally, we understand by *ischuria* (from *ἰσχω*, to hold, hold back, and *οὔρον* urine) retention of urine or sometimes very difficult micturition.

The treatment of paresis of the bladder may be very varied. In light cases where, in strong persons, mostly from a bad habit, a slow and infrequent micturition has become established, daily massage of the bladder, in connection with regular micturition at short intervals and with mild diuretics, such as mineral waters containing soda salts, will be sufficient. Gymnastics, a visit to the country or mountains, cold rubbing of the whole body, cold sitz-baths, douching of the perinæum, over the bladder and the lumbar region; further, showering the back with cold water immediately after coming out of a hot bath, all work very advantageously in stimulating the contractility of the bladder. Of internal remedies, quinine, ergot, and strychnia are given with good effect. Of quinine and ergot 0.5 gramme daily may be given, and strychnia either internally (strych. sulph. 0.02, sacch. albi 3.00, div. in dos. no. vi; 1 or 2 powders daily); or endermically (strych. nitr. 0.10, sacch. albi 5.00, div. in dos. no. x), the mons veneris being shaved, the epidermis being removed by means of a blister, and every day a powder dusted on the denuded corium; or hypodermically (strych. nitr. 0.05, aq. dest. 10.00; one half to a whole Pravaz syringeful daily), which offers the most convenient and the best means of employing strychnia. It is best to inject it into the skin of the abdomen over

the bladder. As soon as muscular twitching or general symptoms of exalted muscular excitability are apparent, this remedy must be discontinued.

Electricity may be used; one pole, as a catheter-formed electrode, being passed into the bladder, and the other pole placed over the lumbar vertebræ, or introduced into the rectum. The constant as well as the induced current may be employed. I can recommend the use of electricity by means of the catheter-formed electrode only for a later period of the treatment, indeed, not until regular catheterization has been practised for weeks and months. Just in the beginning of treatment, stimulation of the bladder often acts very harmfully, for the reason that it is too irritating for the mucous membrane, and sets up a purulent catarrh of the bladder. Later in the course of treatment, however, if there is not at the same time purulent pyelitis or nephritis, this method of using electricity often shows good results. In paresis of the detrusors there is to be recommended the introduction of a catheter-formed electrode into the bladder, the other pole being placed over the lumbar vertebræ, while in paresis of the sphincter, or when this predominates, the same electrode is only to be passed into the pars prostatica urethræ. The sphincter vesicæ can also be made to contract by faradization *per*

rectum, without the need of first passing a pole into the urethra, which will be discussed more fully in connection with enuresis. This method is especially indicated for very sensitive patients.

The best treatment, however, is always a thoroughly carried out, regular course of catheterization, and an advanced case of this kind can scarcely ever be treated with a favorable result without catheterization. Since the catheterization should be as gentle, and cause as little irritation as possible, in paresis and paralysis of the bladder, whenever practicable, and especially in the beginning of treatment, only catheters of vulcanized rubber, the so-called Nelaton catheters, should be used, such as, manufactured from most excellent material (Jaques' patent), are now imported from England. A paretic bladder cannot completely empty itself, and we must therefore, by regular catheterization, force it to gradually contract while we draw off its contents.

The use of the catheter in paresis of the bladder is usually attended with no further difficulty. The patient very soon learns the management of it himself, and in cases running a favorable course it will become possible to gradually diminish the catheterization, indeed even to discontinue it altogether. Not so, however, in cases running an unfavorable course.

Here not infrequently purulent catarrh ensues, and parenchymatous processes of the bladder and kidneys, with abscess formation, and it goes on sometimes wholly unexpectedly and in a short time to a fatal issue.

The conditions of pressure within the urinary apparatus, and especially within the bladder, exert, not infrequently, the greatest influence on the success or failure of operative treatment. Instruments may usually be introduced with impunity into a bladder which possesses full capability of contraction, and catheters may even be allowed to remain in a considerable time; yet when the contractility of the bladder is weakened, and the pressure in it is consequently negative, sometimes the stormiest and most dangerous complications ensue on ordinary catheterization. I have several times seen, even with a slight degree of paresis of the bladder, cystopyelitis and pyelonephritis, with violent febrile symptoms, follow on the first evacuating catheterization. And in every case of paresis and paralysis of the bladder a reaction, with inflammatory symptoms in the urinary organs, is so associated with catheterization that the treatment of this bladder affection in patients up and about becomes impossible. The patients always feel very much relieved after the first catheterization, and cannot thank the physician enough for using the catheter; the second day also is

passed in good health. With the third day, however, they begin to complain of depression and lassitude, the urine becomes turbid, the temperature rises, and on the fifth or sixth day after the first catheterization comes the first severe chill, which renders the patient wholly unable to leave his bed. That the more insufficient a bladder is, and the greater the quantity of urine is which must be drawn off with the catheter, so much the more severe is the subsequent reaction, is easily understood. There are cases recorded in literature where in paresis of the bladder the evacuating catheterization was undertaken with the patient standing erect, and where the patient, after a large quantity of urine had been drawn off, at the end of the catheterization suddenly fell dead. It is therefore advised always to pass the catheter in the horizontal position. Not rare also are cases in which, with the first catheterization, a perfectly normal urine is evacuated, the patient looking, moreover, healthy and strong, and in which, after an interval of 8 to 10 days, the same patient perishes with uræmic symptoms. In these cases, to the purulent cystopyelitis an acute, usually suppurative, nephritis is added. There are also cases in which after the third day of catheterization, the urine begins to grow bloody. The bleeding is usually parenchymatous, coagula are not present, yet it can

be demonstrated microscopically, by the evidence of hæmorrhagic renal epithelium and of so-called blood casts, that not alone the bladder, but the whole urinary tract bleeds. The urine has now a red, now a brown or black color; later, after a purulent catarrh of the bladder has also developed, the color of the urine becomes brownish green, the reaction strongly alkaline, and the odor strong of decomposition. We have to do, then, in a word, with an ichorous hæmorrhagic cystitis or cystopyelitis with or without suppurative nephritis. Sometimes it is observed, when the sediment is thoroughly examined with the microscope, that a growth of bacteria is rapidly progressing. Not only are single, small, two and four limbed bacteria seen in vigorous motion, but whole clumps and shreds are brought to view by the microscope which consist of motionless bacteria massed together. These collections of bacteria, when from the bladder, appear in large, irregular, membranous masses; but if they have been compressed in the kidneys, they tightly plug the tubules, and when such plugs of bacteria pass off with the urine, they appear under the microscope as beautiful cylindrical casts, which consist entirely of motionless bacteria (*Nephritis parasitica* of Klebs). The prognosis in nephritis suppurativa is almost always, in these cases, unfavorable.

There are yet other cases, in which the nephritis suppurativa has not involved the whole kidney, and in the course of a few weeks comparative health is established; this process, however, is gradually associated with an interstitial nephritis, to kill the patient with all the more certainty after an interval of 2 or 3 years.

Very often we see parenchymatous processes in the urinary organs set in after catheterization. The patients are usually confined to the bed, and are feverish. The urine is relatively only slightly clouded with muco-pus, and contains only correspondingly little albumen. Suddenly comes a chill that is soon followed by a second and a third, and at last, after the evacuation of a large amount of pus with the urine, there is improvement. Yet this improvement lasts only a short time, for soon the chills begin anew, again to give way to improvement after repeated evacuations of pus. This play of improvement and exacerbation may last weeks and months, until finally permanent improvement ensues, or until the patient perishes. Still there remains in the urine constant evidence of cystopyelitis, which, although late, passes gradually into a nephritis.

The cause of these unpleasant complications of paresis of the bladder after catheterization is to be sought in the negative conditions of pressure within the urinary apparatus. In paresis

and paralysis of the bladder, this organ can never be completely emptied spontaneously; there remains always in the bladder a greater or smaller residuum of urine. This residuum of urine, usually increasing year by year, exerts by its volume a certain lateral pressure on the walls of the bladder. Likewise, on account of this residuum in the bladder, is the flow of urine from the ureters embarrassed; these latter are also distended by the urine standing in them, and suffer a great degree of lateral pressure from the accumulated urine. Still further, the accumulation of a large quantity of urine in the bladder and ureters acts on the kidneys and their function as a hindrance. Since the urine cannot flow freely out of the renal tubules on account of the stagnation, the kidneys must work with increased secreting power and pressure, in order to overcome the back pressure of the urine accumulated in the bladder and ureters. This increased secretory pressure finds its confirmation in the evidence of a greater or less amount of albumen in the still spontaneously passed urine. If now in such cases the accumulated urine, which perhaps for years had exerted a strong lateral and back pressure in the urinary tract, be all at once evacuated by catheterization, then there immediately ensues such a negative fluctuation in the pressure, I might say such a hyperæmia ex vacuo, that in-

flammatory processes must, as a rule, follow as the necessary consequence of this disturbance.

In the more favorable cases only mucous or purulent catarrh of the bladder, of the pelvis of the kidney and ureters, will take place from this hyperæmia ex vacuo; we shall then have only a cystitis or cystopyelitis. In the more severe cases, to the purulent cystopyelitis are added parenchymatous inflammations of the prostate, of the bladder, and the rest of the urinary apparatus, usually with abscess formation. In other severe cases a parenchymatous hæmorrhage of the whole urinary tract is added to the already present cystopyelitis, and by decomposition of the urine suppuration in the bladder is engendered. Finally, in severe cases the kidneys also will react, presenting usually the symptoms of nephritis suppurativa.

Since, then, these unpleasant symptoms after catheterization are not to be counted as of rare occurrence, it is enjoined to manage such cases with the greatest precaution. If the paresis of the bladder be somewhat advanced, it is important to have the patient go immediately to bed. I never completely empty the bladder at once, that is, at the first examination of the patient. If the bladder contain a large amount of urine, I never at the first sitting draw more than 400 to 500 c.c. I send the patient home, have him go to bed, and then empty the bladder gradually

but completely. If the bladder contain at the first catheterization less than 400 c.c. of urine, and I empty it completely without meaning to, I do not allow the patient to depart with an empty bladder, but I inject into his bladder 100 c.c. of a 1-2 per cent. solution of carbolic acid and have him immediately go to bed. Only when the patients promise to keep their beds for some time (2 or 3 weeks) is it possible, in advanced paresis of the bladder with relatively mild reactive inflammatory processes of the urinary organs, to gradually restore the original relations of pressure within the latter by means of regular catheterization; and notwithstanding the patient is in bed, still sometimes very violent symptoms on the part of the urinary system occur.

After the patient has undressed himself and gone to bed the bladder is completely emptied by means of a soft catheter and washed out with a 1-2 per cent. solution of carbolic acid; about 100 c.c. of this solution are then left in the bladder. The carbolic acid solution is left in the bladder after each catheterization; only the quantity is gradually diminished to a few cubic centimetres, corresponding to the returning contractile power of the bladder. The injection of the carbolized solution into the bladder has the advantage that the bladder is not left completely empty, and that its walls

need not rub against each other, which sometimes causes very painful sensations to the patient. The carbolic acid also has the advantage over other fluids of effectually checking the growth of bacteria, which, with the prevailing negative pressure in the urinary tract, may penetrate unresisted from without even to the kidneys. Pressure on the bladder with the palm of the hand over the symphysis I consider unnecessary, because, with the soft catheter, the bladder is completely emptied by siphon action with a facility corresponding to the lowering of the outer end of the catheter. In the case of beginning inflammatory action in the bladder, moreover, this pressure with the hand much oftener promotes the occurrence of parenchymatous processes.

When paresis of a milder form is present, so that the patient is still able to pass his urine spontaneously after catheterization, a complete emptying and washing out of the bladder by means of the catheter once a day is sufficient. When, however, the patient can no longer urinate spontaneously after catheterization, then at least three times daily, and if severe vesical tenesmus should be present, still oftener, must the bladder be emptied and washed out with a solution of carbolic acid.

In the after-treatment the use of drugs as well as galvanism and a course of bathing at a moder-

ate degree of heat may be employed with advantage, such as has already been described.

In paresis and paralysis of the sphincter, where incontinence of urine is present and the patient is obliged to wear a urinal, a more frequent catheterization, every 1, 2, or 3 hours, in connection with galvanic treatment of the sphincter, is to be recommended. When the sphincter is gradually strengthened by the electricity, then the catheterization may be performed at gradually lengthening intervals.

Among the motor neuroses of the urinary apparatus belongs, finally, *enuresis*. This neurosis is essentially a phenomenon of childhood, and usually disappears with the development of puberty. By *enuresis* is understood the involuntary evacuation of normal urine in childhood, the urinary organs being otherwise normal. By this definition all those conditions which are associated with increased desire to urinate and with affections of the urinary apparatus, are excluded.

In the earliest childhood urination and defecation take place without any subjective sensations. The slightest contractions of the bladder and of the rectum suffice to expel the urine and fæces, since the resistance of the sphincters is wanting. After the first year of life children begin to voluntarily hold back the fæces, while the urine still flows involuntarily, often against

the will of the little one. The ability to hold the urine back at will is usually established at about the end of the second year, that is, after the first dentition.

Now, children who after this period are not yet able to hold back the urine, and who have neither diseased urinary organs nor abnormal urine, suffer from enuresis. Yet enuresis may first appear suddenly in later years, usually, indeed when the organism is weakened by disease and the child appears to be much run down.

Enuresis occurs either in sleep (at night), which is usually the case, and is then called *enuresis nocturna*, or bed-wetting; or it occurs only by day and then only after vigorous bodily movement and muscular action, such as running up stairs, laughing, gymnastics, coughing, etc., and is called *enuresis diurna*. In still other cases involuntary urination takes place by day as well as by night, and the condition is then called *enuresis continua*. With regard to the manner of occurrence the enuresis is continual, repeating itself regularly every day; or it is periodical, occurring irregularly.

Respecting the ætiology, the various enfeebled conditions, as anæmia, scrofula, rachitis, etc., were formerly considered of first importance, yet these do not explain all cases. Not infrequently very well developed, sturdy, and rosy-cheeked children are found who suffer from

enuresis, while among the great number of rachitic and scrofulous children only a very small proportion are affected with this condition. In other cases, too sound sleep is suggested as a cause, but wrongly. Most healthy children sleep so soundly that they can be undressed and moved from one bed to another without awaking, yet they do not wet the bed. Parents often complain to the physician that, although they wake the child two or three times during the night and compel it to urinate, still the bed is found wet through in spite of all. Indeed, not infrequently is the bed found wet directly after going to sleep, although the child had passed his urine immediately before. Trousseau, Bretonneau, and Desault have sought for the cause of bed-wetting, not in general weakness, but rather in abnormal relations of the bladder and the neck of the bladder.

Desault assumes that sudden violent contractions of the detrusors of the bladder, which do not suffice to bring sleeping children to consciousness, are the cause of enuresis. This explanation might account most satisfactorily for the bed-wetting which sometimes occurs as a sequel to cystitis, pyelitis, and lithiasis. With normal urine and a normal condition of the urinary organs, spasmodic contraction of the detrusors occurring in sleep is, to say the least, very problematical. Trousseau and Bretonneau consider

enuresis a neurosis of the neck of the bladder. Inasmuch as they regard the neck of the bladder as identical with the external sphincter, their view is the only correct one. Guersant assumes a congenital weakness (imperfect development) of the sphincter, yet this opinion is, at most, applicable only to certain cases. Still other authors suppose a hyperæsthesia of the fundus of the bladder or of the vesical mucous membrane in general. They would say that the bladder is, after all, only able to hold a small amount of urine, and that, when a certain quantity has been exceeded, the whole mass flows away. Lebert thinks that enuresis nocturna is brought about in this way: that during sleep there is a certain degree of narcosis of the sphincter in such children. The necessity of passing the urine is not felt sufficiently to arouse consciousness, and is satisfied immediately and without heed, so that the bed is then wet through. My idea of enuresis, at least of enuresis nocturna, coincides with that of Trousseau and Bretonneau, inasmuch as I also assume that we have to do with a neurosis in this form of enuresis. That is to say, I believe there is a disproportion between the innervation of the detrusors and that of the sphincter, and that the sphincter is very imperfectly innervated. Since this condition is normal from the expiration of the first year until the completion of dentition,

so in all those cases in which the bed-wetting does not cease in time, enuresis represents the continuance of this infantile condition. That enuresis consists only in an imperfect innervation of the sphincter of the bladder, is shown by the results which are attained by electrical treatment. There are cases, namely, which are already cured after the first faradization of the sphincter and remain so henceforth. Such a therapeutic result can only be explained by imperfect innervation, and never by imperfect development of the sphincter.

Sex exerts no influence on enuresis. Some authors, indeed, assert that many more boys than girls are affected with enuresis, yet this is only apparent. With girls particularly, when they are somewhat advanced in years, the parents take great pains to conceal this condition, especially as they know that the enuresis usually ceases at puberty.

As regards age, it is found that most children are affected with enuresis between the third and tenth years, yet I have often had under treatment girls as well as boys, 14, 15, and even 17 years old. That a kind of bed-wetting, especially enuresis continua, may often be brought about by lithiasis (especially phosphatic stone), cystitis, and pyelitis, and further by inflammatory affections of the vagina, vestibule, and urethra in girls, such as are sometimes caused by

masturbation, has been already mentioned. It is absolutely necessary that, in every case, the urine as well as the genitals of a child affected with enuresis be subjected to a close examination.

Having satisfied ourselves as to the condition of the urine, we proceed to the inspection and examination of the hypogastric region and the genitals. The bladder is carefully examined by palpation in order to ascertain whether it is well filled or not, whether there is retention of urine, etc. Then the meatus urinarius is observed, and, in girls, especially the entrance to the vagina. Sometimes small polypous excrescences are found about the meatus in girls. If these are cut off with scissors the incontinence usually ceases. An examination with the sound is not always necessary if the urine is found to be normal.

The treatment of enuresis may be general and local. For feeble children quinine and especially preparations of iron are indicated, aromatic baths at a temperature of 26° Réaumur [90° Fahr.], as well as cold sitz baths or a mild cold water cure in general. A visit to the country and mountains, river and sea bathing, sometimes have an excellent effect. Belladonna and atropia are highly recommended by Trousseau and Bretonneau. In the evening before going to bed 0.01 extract of belladonna

or 0.0005 (1-120 gr.) atropia is given. With smaller and weaker children these preparations demand great precaution; with larger and sturdier children the daily dose may be gradually increased until some enlargement of the pupils is apparent. At any rate, treatment with these preparations must be continued for months. Ergot, as well as tincture of nux vomica, have sometimes given good results.

The best method of treatment in these cases, however, is the local. If the cause of the incontinence is found in a weakness of the sphincter, it seems logical that an attempt must be made to strengthen the weakened muscle. This is best accomplished by electricity. The earlier cutaneous method gave no marked results. Also the method with the catheter-formed electrode, as used in the incontinence of adults, is not practicable with children. Children are too restless, and the introduction of the urethral electrode, especially in boys, can scarcely be performed without injury. The application of this electrode also not infrequently sets up urethritis and cystitis, conditions which, in enuresis, can only have a very harmful influence. Since, then, direct treatment with the urethral electrode is impracticable with children, I have brought into use, relying on surgical experience, the indirect stimulation of the sphincter vesicæ through the rectum.

It is a well-known fact that operations performed in the lower part of the rectum are not infrequently followed by complete retention of urine. Cases of difficult micturition are also met with in which the urine can only be voided during defecation. This simultaneous action of the sphincter ani and the sphincter vesicæ externus on the application of various stimuli in the rectum is the point of departure of this method of treatment, which also finds its explanation in the anatomical relations of this region.

The hæmorrhoidal nerves, median and inferior, both arising from the pudic branch of the sacro-coccygeal plexus, supply together the lower part of the bladder with the sphincter vesicæ, also the sphincter ani externus and internus, and finally, in women, the vagina. It is therefore clear that an electrical stimulus applied in the rectum, is transmitted to the neck of the bladder, sets up contractions, and thereby strengthens the sphincter vesicæ.

I use for this purpose an ordinary sledge-battery [Schlitten-Apparat] of Dubois-Reymond, which is armed with one element. One pole of the induced current is a metallic pin as large as a lead pencil and 7 cm. long, with a wooden handle (Fig. 5), which is well oiled and passed into the rectum. The other pole is an ordinary sponge-holder, and in boys is

placed on the raphe of the perinæum; in girls, however, in the crease of the buttock. The current must at first, especially in small children, be very weak and scarcely perceptible, because otherwise the children are very easily frightened and cannot be induced to allow the treatment to be continued. Gradually the strength of the current is increased to the limit of endurance. The sittings are held daily, or at least every other day, and usually last from 5 to 10 minutes. The patient lies stretched on a sofa. The treatment lasts on the average 4 to 5 weeks, although, when relapses occur, it must be continued still longer.

(b) The *motor neuroses* which manifest themselves in the *sexual system* are *pollutions* and *spermatorrhœa*.

By *pollution* is usually understood a copious evacuation of semen which takes place during sleep, generally at night, with voluptuous sensations and erect penis. The semen is ejaculated spasmodically by contractions of the muscular tissue of the seminal vesicles and urethra (musculus bulbo-cavernosus).

By *spermatorrhœa* is understood a slight, dribbling, sometimes continual, flow of semen, without erection of the penis



FIG. 5.
Rectal
Electrode.

and without especially pleasurable sensation. This evacuation of semen occurs more copiously after defecation or at the end of micturition.

Pollution might be described as a motor neurosis of the sexual apparatus with spasm of the muscular coat of the seminal vesicle, and spermatorrhœa as a similar neurosis with paresis of the ejaculatory ducts.

The ideas of pollution and spermatorrhœa are commonly confused, especially as there are mixed forms, *i.e.*, cases of spermatorrhœa which sometimes have pollutions also. There are also, however, perfectly pure forms, and therefore the division into pollutions and spermatorrhœa must be retained. There are, namely, cases of pollution which never lose semen by day, after urination or defecation; likewise there are pure cases of spermatorrhœa which never have pollutions, but instead of them daily lose semen in small quantities and often continuously.

Other authors describe nocturnal and diurnal pollutions, and designate as spermatorrhœa every discharge which is not chronic gonorrhœa, and which looks viscid and whitish or colorless. This classification is inappropriate, for, where so-called pollutiones diurnæ are present, a discharge of semen is also usually found after defecation and urination; on the other hand, in the case of a viscid and turbid discharge from the urethra, the diagnosis of sper-

matorrhœa cannot be made without a microscopical examination. That is to say, there is a secretory neurosis of the prostate, prostatorrhœa, which also furnishes a viscid, turbid fluid, which has, however, nothing in common with semen, as will be more fully discussed later on. Curschmann admits nocturnal and diurnal pollutions and spermatorrhœa, and at the same time considers spermatorrhœa the superlative degree of pollution.

When pollutions occur once in 10 to 14 days, they may be looked upon as physiological; if they occur much oftener they are pathological. Curschmann will not allow a division based on the frequency of the pollutions, but holds that pollutions, even when they occur frequently, may still be regarded as a physiological discharge of semen if the individual affected feels on the following day well and strong, or has a sense of relief. He considers pathological on the other hand, all those pollutions, even when rarely occurring, after which the patients feel exhausted and languid, and suffer from headache and impairment of mental vigor.

Since the semen in these affections plays an important rôle, its anomalies should here be briefly spoken of.

Normal semen, as is well known, is a mixture which consists of the secretions of the testicles, of the seminal vesicles, of the prostate, and

other accessory glands of the urinary system. The amount discharged at one time is sometimes greater, sometimes smaller, according to the continence of the producer; ordinarily it is between 10 and 15 grammes.

Normal semen has a whitish color, resembling boiled starch paste, a peculiar, characteristic, heavy odor, and an alkaline reaction. Its consistence immediately after ejaculation is honey-like and ropy; it soon, however, stiffens like gelatine, to become again yet more fluid in the course of 5 or 10 minutes.

The semen, having been poured into a test-tube and allowed to settle, is found, after some hours, to have separated into two layers. In normal semen the two layers are of equal bulk. The lower layer is white, opaque, and consists of the cellular constituents of the semen, in normal semen of spermatozoa. The upper layer is turbid and translucent, the microscope showing only a few cells and some detritus. From the thickness of the layer containing spermatozoa it is sometimes possible to arrive at a conclusion as to the generative power of the semen in question.

If a drop of fresh semen is examined under the microscope, a picture full of movement will be seen. As if an ant-hill had been stirred up with a stick, so the spermatozoa in lively motion confusedly squirm about. Besides these are to

be seen only some epithelial cells, spermatic cells, and a little fine granular matter.

The spermatozoa of normal semen consist of an oval or flattened, pear-shaped, shovel-like head and a long thread-like end which is divided into a middle piece and a tail. The middle piece and tail should be at least ten times the length of the head. The spermatozoa



FIG. 6. — Spermatic Crystals. 300 diameters.

should be present in large numbers, and still show movement at least 12 hours after evacuation.

When a normal semen has been allowed to stand a considerable time, on the second or third day are found, at first only single, later in greater numbers, colorless transparent, rhomboidal crystals (Fig. 6). When incompletely

crystallized, these crystals appear tapering and rounded at the ends. A. Böttcher considers them albuminoid bodies, other authors ammonio-magnesian phosphate. I have also examined these crystals, and found that they consist of phosphoric acid and magnesia; ammonia I could not find.

As regards the amount of semen discharged at one time, it is, as has before been remarked, very variable. The more frequently coitus is repeated the smaller will each time the amount become, until finally only a few drops will be painfully produced. The more continently a man lives, on the other hand, the greater are the amounts of semen discharged at coitus. Nevertheless there are two extreme conditions which are easily distinguishable, namely, *polyspermia* and *aspermia*.

Polyspermia, the ejaculation of a large amount of semen at one coitus, is relatively seldom observed. I have only once examined such a case. A man about 40 years old, robust, yet very nervous, who suffered with polyuria, cystospasmus, and various neuralgic pains, complained to me that with nocturnal pollutions he lost such a large amount of semen that his drawers and the bed were each time thoroughly wet through; and that after coitus the women declared that he must have urinated, for they felt themselves so wet. I had the patient col-

lect the semen discharged at one coitus, and found, indeed, an extraordinary amount, about 35 grammes. Yet the patient told me that he had not been able to collect the whole of the semen. The semen showed normal and living spermatozoa. After settling, it showed that the fluid constituents of the semen, in comparison with the white lower layer comprising the cellular elements, were increased.

Somewhat more frequent is *aspermia* or aspermatisimus, the absence of semen. It is either a permanent or a temporary condition. Its cause is to be sought either in a mechanical obstacle to the discharge of the semen (obliteration of the ejaculatory ducts), or in the fact that no semen is produced, or, if semen is produced, that it cannot be brought to light by sexual stimulus.

In one case I have seen aspermia occur in a married man after prostatitis suppurativa, he not being able to produce semen during coitus, although this had been perfectly possible before the prostatitis. In another case I have observed aspermia in a robust man, 24 years old, which must be a very rare occurrence. This man consulted me as to whether he might contract a marriage, since he was perfectly able to perform the act of sexual intercourse, yet he had never in coitus nor as pollution produced a discharge of semen. I was at first distrustful of the patient's

story, but was able, after long observation, to convince myself of the correctness of his assertions. The young man had never had any sexual disease. His genital organs were normally formed; examination with the sound met with no obstruction in the prostatic urethra. I tried faradization of both testicles, in order to excite the formation of semen, but without result. In spite of many times repeated coitus and other sexual excitement, the patient was unable to produce semen. Several months later I received from him a letter, in which he informed me that he still had no semen; and he recently again sought my professional advice. Since the genital apparatus of this patient was entirely normal; and the man had never had a pollution up to his 24th year, nor had been able, in spite of oft-repeated sexual excitement, to ejaculate semen, I believe that, in this case, we have to do with an absolute, permanent aspermatismus. Whether in such cases the non-excitability of the reflex centre of ejaculation is, according to Schulz, to be considered, I do not venture to express an opinion.

Cases of temporary aspermatismus, on the other hand, frequently occur. Usually, in such patients, gonorrhœa with prostatitis has gone before. These persons also generally suffer at the same time with several, and often very different, neuroses, now of the urinary and now of

the sexual system. The patients have erection of the penis and perform the act of coition, yet, in spite of every effort, they are not able to ejaculate semen.

As for the color of semen, it may be bloody, *i.e.*, reddish brown, or yellow, containing pus. Both the appearances occur in prostatitis and inflammation of the seminal vesicles. These shades of color are best seen when the semen has dried on white cloth. In the dry condition the stain is sometimes observed to be bordered with blue or violet; this indicates a large amount of indigo in the semen. If pus and indigo are present at the same time, beautiful bluish green spots of semen may be seen.

The spermatozoa likewise appear under varied conditions. Sometimes they are fresh and lively; sometimes, however, semen is discharged which contains entirely motionless spermatozoa. I have seen cases of an advanced stage of spermatorrhœa, in which, after passing urine, a large quantity of semen was discharged which looked normal, but which contained spermatozoa wholly motionless. The number also of the spermatozoa may be greatly diminished, as may sometimes be observed in old age, or after oft-repeated sexual excesses. Again, the form of the spermatozoa sometimes suffers changes. Thus, not infrequently, in inflammation of the seminal vesicles, with or without inflammation

of the testicles, are seen, in the semen containing blood and pus, motionless spermatozoa with shortened or spirally twisted tails, or even the shovel-shaped heads alone.

Indigo not infrequently appears, on microscopic examination, among the spermatozoa, in the form of beautiful flakes of a cornflower blue, or as bluish-black scales.

When spermatozoa are entirely absent in the semen, the condition is called *azoöspERMIA*. Since in this semen the fructifying element is wanting, there is *impotentia generandi*. It is well to distinguish this condition from *impotentia coeundi*, for patients affected with *azoöspERMIA* are able to perform the act of coitus often and vigorously, and usually have no idea that their semen is abnormal.

AzoöspERMIA usually occurs after epididymitis gonorrhoeica, especially when the latter was bilateral. Yet this is not absolutely necessary, since an inflammation of the spermatic cords alone may bring about this condition. *AzoöspERMIA* takes place by obliteration of the vasa deferentia; the passage of the secretion from the testicles to the vesiculæ seminales is thereby stopped, and the spermatozoa can no longer appear in the ejaculated semen. The semen represents only the secretion of the vesiculæ seminales, mixed with that of the urethral glands.

If semen of this kind be examined in a fresh

state, it will be noticed that it has been discharged in normal amount. It will also be noticed that it coagulates like normal semen; only in the color will a slight difference be observed. The semen is much more transparent and watery. If it be examined microscopically, sometimes lymph corpuscles will be seen, sometimes colloid degenerated epithelium, and again, molecular fat. If allowed to settle some hours, there are seen in great numbers and well formed those large, transparent crystals of phosphoric acid and magnesia — the spermatic crystals. From this account of azoöspemia after obliteration of the vasa deferentia, it appears clear that the ejaculated semen consists of the secretion of the seminal vesicles, and that the testicles furnish only the fructifying constituent, the spermatozoa. Since the spermatic crystals also occur in azoöspemia, it can be affirmed with certainty that they are peculiar to the secretion of the seminal vesicles.

The quick or tardy appearance of these crystals affords an inference as to the fructifying power of the semen. That is to say, if a semen contain many and living spermatozoa, the crystals appear very late, sometimes not until the third day, because crystallization is impossible in a fluid full of movement, such as a normal semen containing many living spermatozoa. If, however, the semen contain motionless sperma-

tozoa or none at all, then the spermatic crystals appear in the course of half an hour. The earlier, therefore, and the more perfectly formed do these crystals appear, and the greater is their number, just so much the worse is the semen containing them.

The commonest causes of pollutions and spermatorrhœa are sexual excesses, and especially masturbation. Sexual excesses imply protracted erections, and each erection is associated with swelling of the caput gallinaginis. Through this too frequent and long-continued swelling in the prostatic urethra, a catarrhal condition becomes localized in the caput gallinaginis, and a marked hyperæmia and hyperæsthesia in the whole pars prostatica urethræ, whence, originating reflexly, come sometimes pollutions and sometimes spermatorrhœa. That a catarrhal process in the caput gallinaginis is at times involved, we see from the fact that, in the urine of patients affected with pollutions, there are sometimes shreds floating which consist of pus corpuscles, epithelium, and spermatozoa. If such patients be examined with the sound, the prostatic urethra is found so sensitive that the patients utter loud cries of pain. If the mucous membrane of this region be examined with the endoscope, it is found to be of a dark, cherry-red color, swollen, partly denuded of epithelium, and bleeding easily.

Inflammations of the prostate also have sometimes pollutions and sometimes spermatorrhœa as a consequence. Especially in chronic gonorrhœa, after inflammation of the seminal vesicles, pollutions make their appearance as never before. In chronic prostatitis and hypertrophy of the prostate, on the contrary, spermatozoa can almost constantly be seen in the urinary sediment, as a proof that, through inflammatory processes or gland enlargement, the sphincters of the ejaculatory ducts have been rendered insufficient.

In affections of the central nervous system, sometimes pollutions and sometimes spermatorrhœa are known to occur. A too tight prepuce, phimosis, is also not infrequently the cause of pollutions. I have repeatedly, in cases of phimosis, by its removal, cured pollutions as well as impotence. Nervousness alone would hardly produce discharges of semen, yet they are particularly obstinate and severe in nervous persons who have at the same time committed sexual excesses or masturbation.

The diagnosis of seminal discharge must always be confirmed microscopically. Of course the presence of spermatozoa plays here the most important rôle, yet only when the semen of the individual in question actually contains spermatozoa. In azoöpermia, which may be associated with pollutions or with spermatorrhœa,

the absence of spermatozoa is, of course, insufficient evidence. In such cases a drop of the fluid, on a slide, must be covered over, and after some hours examined for the characteristic spermatic crystals.

If spermatozoa be found constantly or very frequently in the urinary sediment; if the patient discharge after urination or after defecation a large amount of semen; or, finally, if it be often possible to squeeze out of the penis a whitish drop containing spermatozoa, then the patient suffers with spermatorrhœa. If, however, the result of this examination be negative, and only a copious discharge of semen take place at night, then the patient suffers with pollutions. Mixed forms are, indeed, not rare, yet either the symptoms of pollution or those of spermatorrhœa preponderate, so that this distinction may almost always be easily made.

If pollutions occur very often, the most varied general symptoms are associated with them, especially symptoms of irritation of the general nervous system, while, in the true form of spermatorrhœa, symptoms of depression, impotence, and melancholy are most prominent. Patients with frequent pollutions usually suffer from faintness and dizziness in the head, which symptoms appear on the morning after the pollution, and render the patient incapable of every mental exertion. Sometimes there is a dragging

pain in the occipital region. The patients exhibit a reflex irritability, so greatly exaggerated that they start at every unexpected noise, at every moment the face changes color, the eye-balls roll unsteadily, and a disturbance of speech, in the highest degree of excitement, is so far noticeable that the voice fails at certain words. Very often difficulty in breathing and nervous palpitation of the heart occur. If the patients are made to strip, on observing carefully the bare body a continual, slight, subsultus tendinum will be noticed.

In spermatorrhœa it is not infrequently found that the testicles and the skin of the external genitals are less sensitive to electrical stimulation; while the urethra is hyperæsthetic.

The treatment of seminal discharges is both general and local. At the same time a strictly regulated habit of life must be prescribed for these patients. It is clear that, before all, sexual excitement and masturbation must be avoided; likewise is it necessary for the patients, at least temporarily, to avoid severe physical or mental labor. An invigorating trip to the country or mountains, in connection with a milk or cold water cure, as well as river or sea bathing, are especially indicated. The diet should consist of easily digestible dishes, and should be entirely non-stimulating. Spices, spirituous liquors, strong coffee and tea should

be avoided. It is also better to eat often during the day, and not too much at a time. Especially in the evening, before going to bed, only an extremely frugal meal, with little drink, should be partaken of, in order that neither the stomach and intestines nor the bladder may be overloaded.

The sleep should not last too long, and early rising is particularly to be recommended. The bed should have a rather hard, well-filled mattress. The pillow should be filled with horse-hair, and, for covering the body, thick, heavy, and heating coverlets should never be used. The patients should never lie on the back; and when they awake in the morning they should immediately empty the bladder, for, in the dorsal position, the distended viscera press on the return blood-vessels, and thereby increase the hyperæmia of the prostatic urethra. The increased hyperæmia intensifies also the hyperæsthesia of this part, and it requires then relatively very slight irritation (for instance, a heavy coverlet, a touch of the hand, etc.), to set up reflex contractions of the seminal vesicles, that is to say, pollutions.

Quinine and iron as tonics are indicated when weakness and anæmia predominate. From camphor and from lupulin I have seen no great results, and just as little from belladonna and valerian. On the other hand, bromide of potas-

sium works excellently, but large doses must be given. I usually give from 3 to 4 grammes a day, dissolved in a large quantity of milk or sugar water. Sometimes, especially in spermatorrhœa, ergot works very well, of which at least half a gramme daily must be taken.

The electrical treatment is carried out, according to Benedikt and Schulz, with the constant current, and lasts from 6 to 10 weeks, with sittings of 2 to 3 minutes 4 to 6 times a week. The current should be so weak as to be just felt. The copper pole is placed over the lumbar vertebræ, and with the zinc pole are successively and repeatedly stroked the spermatic cords, the penis, and the perinæum. By this procedure the abnormal reflex excitability of the spinal cord should be reduced.

The best method of managing the seminal emissions, however, is the local. Keeping in mind that, by sexual excesses or masturbation, changes in the prostatic urethra have been brought about, from which arise, reflexly, pollutions and spermatorrhœa, the advantage of local treatment will be obvious.

In many cases the treatment with large and heavy metallic sounds alone has proved beneficial. Once a day, or at least every other day, the sounds are passed into the bladder, the patient lying on his back, and left in for a period gradually increasing from 5 to 30 minutes. As

large a sound should always be chosen as can be made to pass the orificium urethræ; usually Nos. 20 to 26 of the Charrière scale are employed. These sounds act through pressure on the pars prostatica as well as by their weight. If there is at the same time marked hyperæsthesia of the urethra, we may begin with passing bougies, and for this purpose Pitha gives preference to the wax bougie over all others.

In very much the same way, and sometimes much better, works the cold sound (called psychrophor by Winternitz) (Fig. 7). This is a metallic, closed, double catheter, to the inflow and outflow of which long rubber tubes are attached. The end of the tube from the inflow is placed in an elevated vessel filled with cold water; the outflow leads to an empty vessel on the floor. By suction on the outflow tube the current of cold water is started, and flows through the double sound into the lower vessel and keeps the sound



FIG. 7.
The Cold Sound
(Psychrophor).

into the lower vessel and keeps the sound

uniformly cold. Here the metallic pressure acts in connection with the cold on the prostatic urethra. The temperature of the water varies. It is usual to begin with water that has stood in the air (16° to 18° Réaumur [68° to 72° Fahr.]), and gradually pass to fresh spring water. I have often observed that very cold water is not well borne, while water at the ordinary temperature works very well. A sitting lasts, at first, 5 minutes, increasing to 30 minutes. Should symptoms of catarrh of the bladder arise, the treatment must be suspended for a few days.

Astringents also work very beneficially, in a liquid form as well as in the form of small urethral suppositories, of the size of a barleycorn, introduced into the pars prostatica by means of Dittel's porte-remède. For using astringents in the liquid form, my short catheter-syringe may be employed to advantage, in the same manner as described on page 28. If a more powerful and lasting effect is to be produced on the mucous membrane, urethral suppositories and Dittel's porte-remède are used (Fig. 8).

In the figure, A represents a catheter, with open end and a short curve, made of silver. This is closed by an obturator B, also made of silver. The obturator ends in an olive-shaped bulb, which just fits in the opening of the catheter C, and rounds off the end. At the distal end is

a knob, which by means of a bayonet-lock may be fixed immovably in the catheter.

I use, for the purpose, small suppositories of

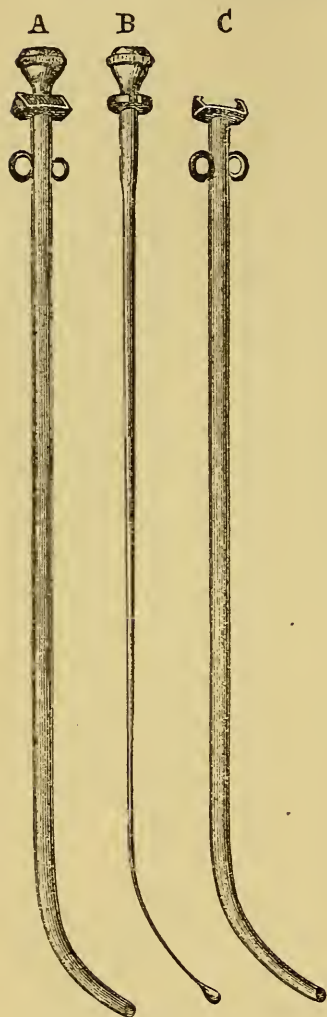


FIG. 8.—Dittel's Porte-remède.

tannin and cacao-butter, or of nitrate of silver and cacao-butter (tannin 0.1 gramme, or nitrate of silver 0.01 gramme, in each suppository).

The patient lying on his back, the porte-remède is passed, under control of the left forefinger, which is in the rectum; the obturator is then withdrawn and the suppository pushed in. By means of this instrument it is possible to deposit a given amount of a remedy in the prostatic urethra. If we wish to cauterize the caput gallinaginis, it is done in the same way, using a suppository of double the strength of nitrate of silver (*i.e.*, 0.02 gramme).

After the suppository has been deposited in the pars prostatica, the

patient lies quiet a quarter of an hour. During this time the suppository has melted and has done its work. It is then best for the patient to go to bed. If, for the purpose of cauterizing, the stronger nitrate of silver suppositories have been used, the patient feels, some minutes later, a severe vesical tenesmus and a stinging pain at the neck of the bladder. A few hours later — sometimes, however, not until the next day — bleeding from the urethra ensues, sometimes slight, sometimes profuse. The urethra is very sensitive and micturition painful. The patients crave the horizontal position in bed. If the hæmorrhage be profuse, cold compresses must be applied to the perinæum. After 2 or 3 days the pain and desire to urinate diminish, and the patient finds himself well, with the exception of a slight urethral discharge which vanishes in a day or two. I have observed retention of urine, profuse hæmorrhage, and other unpleasant symptoms after cauterization. I therefore advise that cauterization be only undertaken when the patient can remain quietly in bed for from 2 to 5 days. In very sensitive patients I use at first only half the dose, that is, half a suppository, and if this is well borne, the full dose is then given. A single cauterization is not usually enough; it must be repeated at least 2 or 3 times. Oftener than once, however, or, at most, twice a week, cauterizing with nitrate of silver should not be

done. Good as are the results of cauterization by Lallemand's method, I prefer the portementède of Dittel, because, as already mentioned, it is possible by means of this instrument to place accurately in the prostatic urethra a given amount of nitrate of silver.

With spermatorrhœa predominating, when pollutions occur seldom or not at all, faradization through the rectum may be tried, as described in connection with enuresis on page 80. Sometimes improvement is so far established that the sexual desire is again aroused, erections take place, the frequent loss of semen after urination and defecation ceases, and nocturnal pollutions occur instead. Assuming that spermatorrhœa consists in a relaxed condition of the ejaculatory ducts, Trousseau has contrived his compressor prostatæ for the cure of seminal emissions. This is a plug, of the size of a pigeon's egg to that of a hen's egg, olive-shaped on one end, the other end gradually tapering and fitted with a cross-piece. The plug is perforated, for the free escape of flatus, is made of hard rubber, and is kept in place by means of a T-bandage. This olive-shaped, somewhat flattened plug, which is pushed into the rectum, presses on the prostate, and should press together the dilated and relaxed ejaculatory ducts and thereby bring about a cure of the spermatorrhœa. The instrument is

usually very badly borne by the patient, and it works, as a rule, very unsatisfactorily.

When pollutions are kept up by phimosis, varicocele, stone, and morbid processes in the rectum, all these harmful influences must, of course, be removed by operation.

3. The SECRETORY NEUROSES of the genito-urinary system are so often complicated with the motor and sensory neuroses just described that they are of secondary consideration and are only rarely observed as independent conditions. Since most of the secretory neuroses have already been considered in the description of certain motor and sensory neuroses, a few of them only will now be briefly mentioned.

(a) The secretory neuroses of the *urinary system* are confined to anomalies of the renal function of secretion. We recognize these anomalies by examination of the urine, which has been considered in detail under the head of "Urine." We found there sometimes *polyuria* (*urina spastica*), sometimes *anuria* (*anuria hysterica*), sometimes the secretion of an *alkaline* or *neutral urine*, without there being at the same time a catarrh of the bladder. Sometimes we see the *earthy phosphates* precipitated by heating the urine and the urine turbid (*phosphaturia*, Teissier), sometimes a large amount of *indican* is found (*glaucuria*, Kletzinski), sometimes *sugar* and *albumen* temporarily appear.

(b) The secretory neuroses of the *sexual system* include *polyspermia* and *aspermia*, already described, and it remains only to consider the secretory neuroses of the urethral glands. With every sexual excitement, as soon as erection of the penis has occurred, long before the ejaculation of semen has taken place, a clear, transparent, viscid drop, like white of egg, oozes from the meatus. This clear, viscid drop represents the secretion of the accessory glands of the urinary and genital tract, and consists of the secretion of the prostate, of Cowper's glands, and of the glands of Littre. Since the prostate is the largest gland in this connection, it is clear that the mass of this clear fluid must be prostatic secretion. The object of this secretion seems to be to lubricate the urethra and thereby facilitate the discharge of the semen, which is a fluid of greater consistency than urine. If this clear, viscid fluid is secreted in greater amount, indeed continually and without sexual excitement, this condition is called *prostatorrhœa*. Gross was the first to describe this condition correctly. He ascribes as the cause subacute and chronic prostatitis. Prostatorrhœa may be transient or permanent. To a slight degree it is often found after gonorrhœa, when the yellowish drop gradually becomes whitish and flocculent and finally colorless, watery, and slightly viscid. The pa-

tients usually say that the gonorrhœa has disappeared, but that a certain moisture remains. Whenever they examine the penis and hold apart the lips of the meatus a drop of clear, slightly viscid fluid appears, which annoys them. This hypersecretio urethralis, moreover, is not always so slight. Sometimes it is so copious that the shirt of the patient is constantly wet through, as in acute gonorrhœa.

The cause of prostatorrhœa is either masturbation, sexual excess, or, as is usually the case, gonorrhœa. Although other sources of irritation at the neck of the bladder and about the prostate, such as vesical calculus, diseases of the rectum, etc., may act as causes, yet gonorrhœa furnishes the most and the best cases of prostatorrhœa. As a rule the prostatorrhœa is most abundant when there has been evident prostatitis, or when the gonorrhœa was complicated with cystitis and epididymitis. In chronic prostatitis with thickening and enlargement of the lobes, or hypertrophy of the prostate, there is also a hypersecretion, yet it appears no longer clear and transparent, but turbid from cell elements (pus corpuscles and prostatic epithelium), milky and flocculent (*milchende Prostata*.)

The diagnosis rests upon microscopic examination of the secretion. If the colorless or whitish drop contain spermatozoa, spermatorrhœa is present and not prostatorrhœa. If the

fluid contain no spermatozoa, it may be either the semen of azoöspemia or it is secretion from the prostate. The drop is allowed to dry slowly on the microscope slide, or, if a larger quantity can be obtained for examination, it is allowed to settle several hours and the sediment is examined. If the beautiful spermatic crystals are found (characteristic of the contents of the seminal vesicles), the fluid is the semen of a patient affected with azoöspemia; if, however, in the slowly dried drop only the characteristic crystals of common salt are seen, the secretion in question is from the prostate. Sometimes also concentric amyloid bodies may be discovered, which demonstrate with certainty the prostatic origin of the secretion. Usually, however, in the clear, viscid fluid are found only a few cylindrical epithelial cells and mucous corpuscles.

On examination with the sound the urethra is generally found extremely sensitive in the prostatic portion. Examination with the finger *per rectum* shows nothing abnormal. Sometimes, however, the remains of a prostatitis are evident, such as hard places, pit-like depressions, asymmetry of the lobes, etc. The urine is clear and shows usually, on heating, the phosphatic turbidity.

The prognosis in prostatorrhœa is favorable; yet, as in most genito-urinary neuroses, the duration of the treatment to complete recovery cannot certainly be stated.

The treatment of prostaticorrhœa is the same as that of seminal emissions, and has been minutely described. It may be remarked that here sometimes faradization of the prostate *per rectum* (see page 40) has given very good results. Most to be recommended, however, is the local treatment. The best results have followed the use of astringents in solution, by means of the short urethral catheter-syringe (see page 29). Should, however, these methods not have the desired effect, cauterization of the prostatic urethra by means of Dittel's porte-remède (see page 100) is indicated.

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STERILITY AND IMPOTENCE.

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OUR knowledge of the *potentia generandi* in men is of the most recent date. Only a few years ago the opinion was held that men who were able to perform the act of coitus to the satisfaction of both parties must also possess procreative power. In case of unfruitful marriage all the blame was usually thrown on the wife. She was subjected, sometimes to operation, sometimes to local treatment and baths, for the most part, however, without attaining the desired result. Only since the male semen has begun to be more closely examined microscopically, and since the morbid processes which lead to sterility in the male have come to be better understood, has the truth gradually become established that *potentia coeundi* in the male does not always imply *potentia generandi*.

Potentia generandi depends solely upon the procreative power of the semen, while *potentia coeundi* signifies the ability to perform the act of coitus, and is often found unimpaired in cases where the semen is absolutely sterile.

It is a well-known fact that so-called impotent

men, who attempt coitus with flaccid penis, are still sometimes able to impregnate the female, if they only possess a normal semen. Accusations of paternity are not rare in this connection. There are also in literature cases of impregnation of virgins with a wholly intact, narrow hymen, where the ejaculation—in order to avoid impregnation—had taken place at the vulva or its neighborhood. Professor G. Braun, some time ago, published some very interesting cases of this class. It is, moreover, also a well-known fact that here and there in obstetric clinics girls in labor are met with, in whom the hymen is found entirely intact. The power of procreation depends, for the most part, only upon the quality of the man's semen. As proof of this sterile marriages are often brought to notice, where the husband is remarkably potent and fulfils his conjugal duties perfectly in every particular; yet the marriage remains sterile because the semen of the husband is unfruitful.

In the following pages the subject of *potentia generandi* will first be discussed, and, later, that of *potentia coeundi*; finally, a few therapeutic hints will be given.

Since *potentia generandi*, as already mentioned, depends, for the most part, on the good or bad condition of the semen, first of all should be considered the male semen in health and disease.

Male semen¹ is a complex substance, and consists, under normal circumstances, of various secretions, namely, the secretions of the testicles, of the seminal vesicles, and of the accessory glands of the urethra, especially the prostate, Cowper's glands, and the mucous glands of the urethral mucous membrane. These secretions together form the normal semen after its ejaculation. If one or the other of these secretions fail, sterility may under certain circumstances ensue.

According to Vauquelin semen consists of 10 per cent. solid matter and 90 per cent. water. Of the solid matter 6 per cent. consists of organic constituents, including the spermatozoa, 3 per cent. of earthy phosphates, and 1 per cent. of alkalies (chloride of sodium). According to Hoppe-Seyler, semen contains an albuminous substance called spermatin, which, in its reactions, bears a resemblance to casein. The spermatozoa contain also lecithin in abundance.

In normal semen, besides spermatozoa, spermatie cells, epithelium from the prostate and urethra and molecular detritus, so-called seminal granules can be distinguished with the microscope (Fig. 9). Before puberty, as well as in old age, semen contains no spermatozoa, but only seminal granules, yet nevertheless aged men are often met with, in whose semen numer-

¹ See description of normal semen on page 83.

ous spermatozoa are still found. Sometimes these granules are also massed in cylindrical forms. These have some resemblance to the dark granular renal casts which occur in the urine in chronic Bright's disease. The spermatie cells are the breeding-places of the spermatozoa; and, according to Kölliker, out of each nucleus of a cell a spermatozöon develops.

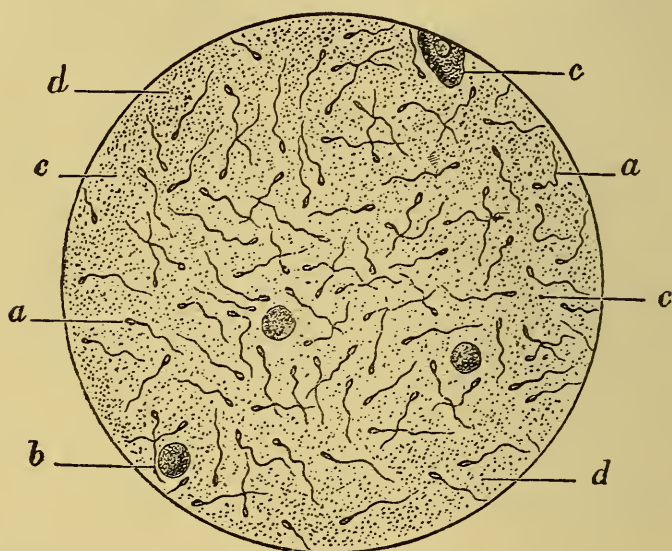


FIG. 9.— Normal Semen. *a*, Living spermatozoa; *b*, Spermatie cells; *c*, epithelium (from the prostate?); *d*, seminal granules. 300 diameters.

Normal semen, sheltered from light and cold, after 48 hours still shows living spermatozoa under the microscope. In spermatozoa which have died gradually after ejaculation the tail is outstretched, or, at most, slightly curved, whereas in those that are discharged motion-

less, *i.e.*, dead, the tail is either rolled up in a spiral or bent. Spermatozoa which have been killed by injurious secretions (urine, acid vaginal secretions, etc.) very commonly show this condition.

The motion of the spermatozoa in fresh semen is extremely lively. By whiplike wriggling of the tail the head is urged forward and winds its way, without striking against other cells, through the narrowest passages in the microscopic field. This migration of the spermatozoa, suggestive of voluntary motion, caused observers in early times to regard the spermatozoa as organized living creatures, as indicated by the term, "seminal animalcules" [Samenthieren].

Water soon checks the movements of the spermatozoa and often causes the tails to curl up in a loop. Concentrated solutions of salts, sugar, albumen, urea, etc., may, however, revive these motionless spermatozoa, so that they regain their former activity. Animal secretions of alkaline reaction and moderate strength are favorable to the vitality of the spermatozoa, while thin and acid secretions, such as urine, acid mucus, etc., have a harmful influence. Caustic potash and soda invigorate the spermatozoa; on the other hand, cold completely arrests their movements, as also do solutions of metallic salts and acids.

The *pathological changes* of male semen are manifold. The amount of semen furnished by one ejaculation is very variable, and the following distinctions may be drawn :—

1. *Aspermia*—absence of semen. By this is understood a condition in which the patient, whether in coitus or other sexual excitement, is unable to ejaculate semen. Aspermia is either absolute or relative, permanent or temporary. The absolute and permanent form of aspermia is rare. It is either congenital or acquired. In the first case it concerns men who have never, during their whole lives, been able to discharge semen, either in coitus, under sexual excitement, or as nocturnal pollutions.

Such a case have I observed in a man, 40 years old, who, although he had been married 10 years, had never been able to produce semen. His wife declared that she had never found herself wet with semen after coitus. His power was pretty good, although not remarkable. The testicles were small, otherwise the genital organs were perfectly normal. The patient said that during coitus he experienced the sensation of ejaculation, and felt a kind of satisfaction, although he had never seen any semen. In order to prove whether or not the semen regurgitated into the bladder during coitus, the urine passed after the act was examined for seminal constituents, but with negative result.

Another case, that of a single man, 24 years old, I have published elsewhere (see page 87).

For this form of permanent aspermatismus no cause can usually be shown; the condition seems to be merely congenital. The genitals in the second case appeared perfectly normal, the penis capable of erection, the testicles not small, and yet no semen could be produced. In the first case the testicles were smaller, yet small testicles are often met with which furnish perfect semen. From the size of the testicles no conclusions can be drawn as to the quantity and quality of the semen. No affection of the central nervous system could in either case be demonstrated. In such cases we can only assume, with Schulz, a non-excitability of the reflex centre of ejaculation.

In absolute aspermia no other constituent of semen is secreted than one or two drops of viscid mucus which come from the smaller glands of the urethra and which generally accompany erection. Ejaculation is wholly wanting, and from the accounts of patients it must be assumed that the spasmodic contractions of the perineal muscles which complete the ejaculation are entirely absent.

More common than congenital and permanent absence of semen are the acquired forms.

The acquired forms of permanent aspermia are usually brought about by affections

of the prostate. Not infrequently purulent lobar prostatitis or suppuration of the whole prostate has preceded. In the acquired form of permanent aspermia, both ejaculatory ducts must have become occluded and the glandular tissue of the prostate itself have been for the most part destroyed. The occlusion of one duct only sometimes causes a perceptible diminution in the amount of semen, but usually it is not noticeable.

A man from Roumania, about 40 years old, once consulted me for trouble of this kind. He had formerly cohabited in an entirely normal manner; but some years previously he had had a severe illness, with retention of urine and profuse suppuration in the perinæum, after gonorrhœa, and since that time he had never been able to discharge semen in coitus. He said that at the conclusion of coitus he experienced a sort of satisfaction, although no ejaculation took place.

On examination of the genital tract I found the urethra slightly contracted in the bulbous portion. The perinæum showed a deep, retracted scar, where, apparently, after an operation, a great deal of pus had been discharged. In place of the prostate there was felt, *per rectum*, a small flattened nodule, scarcely the size of a pigeon's egg, and the whole anterior wall of the rectum was involved in the cicatricial contraction.

In view of this condition there is scarcely a doubt that aspermia had here been brought about by obliteration of the ejaculatory ducts and suppuration of the prostate.

Although the moderate stricture could be easily dilated, no further progress was made toward the secretion of semen.

A second case, a merchant here in Vienna, 31 years old, likewise consulted me on account of aspermia. He was married, but childless. Formerly he was able to accomplish the act of coitus in a normal manner, but within a year no semen could be made to appear even with forcible straining. Pollutions had also entirely ceased within this time. At the same time the patient complained of frequent and scalding micturition.

The patient was of feeble build, had a hoarse voice, and had already suffered years with catarrh of the lungs. Physical examination showed dullness at the apices of the lungs. The patient yearly visited the health resort Roznau. The urine contained pus and showed the characteristics of catarrh of the bladder. The sound passed with ease as far as the prostate, but could only be introduced into the bladder with great difficulty and pain. *Per rectum* a hard, nodular, immovable tumor, as large as the fist, was found.

In this case it must be assumed that tubercu-

losis of the prostate, which had here grown to an unusually developed, indurated infiltration, had rendered the ejaculatory ducts impervious and the prostate incapacitated.

Beside these forms there is a temporary aspermia, with a comparatively normal condition of the sexual apparatus. This form of aspermia sets in suddenly, lasts a few weeks or months, and then vanishes as suddenly as it came.

Persons thus affected are generally of a very nervous temperament. Either they have been nervous from birth or have become so through excesses in venery, masturbation, or frequent attacks of gonorrhœa. In the first case it is usually a certain anxiety, a dread of failure of the act of intercourse, which makes the patient sometimes impotent, sometimes aspermous; in the last case, however, the gonorrhœal process appears to have been, in fact, the immediate cause of the nervous disturbances in the sexual system. These patients are usually aspermous in coitus, yet not infrequently suffer with pollutions.

Sometimes such cases occur after prostatitis, after inflammation of the testicles, and catarrh at the neck of the bladder, following gonorrhœa. Here a reflex neurosis, proceeding from the prostate, is generally concerned, which commonly yields to appropriate local treatment.

Relative aspermia, it must be admitted, is especially rare. Here we have to do with cases

in which the semen can never be produced in coitus, even when, with penis erect, the act is prolonged until exhaustion. As soon, however, as the patient has fallen asleep, he has an emission.

I have had a case of this kind under observation a whole year. The patient, an otherwise robust and healthy young man, two years married, can accomplish the coitus with penis erect, yet he never has an ejaculation of semen within the vagina; but a supplementary discharge appears as a pollution during sleep. The patient has never had any sexual disease, yet he declares that he experiences no voluptuous sensation in coitus. He had never attempted coitus before marriage.

The total absence of the voluptuous sensation in this case makes it probable that the causes of this form of relative aspermatismus are to be sought in the nervous system, especially as the genital organs and the semen have been found perfectly normal. A non-excitability of the centre of ejaculation only could here be properly considered, since in sleep the ejaculation takes place as a pollution in a normal manner.

There are other forms of aspermia which are best called "false." Such is the aspermia in cases of tight stricture and other obstructions in the course of the urethra. In such cases the semen enters the urethra during ejaculation, but,

since it cannot pass through the narrow stricture, it cannot be seen, and the patient appears aspermous.

Since, during erection, the caput gallinaginis swells and the urethra is thereby closed posteriorly toward the bladder; since, moreover, the stricture is made so much the narrower by the erection, so are the pains of the patient, during ejaculation, easily explained. The semen, which is compressed in the part of the urethra behind the stricture, can escape neither forward nor backward, hence the lancinating pain in the perinæum during ejaculation. The erection now gradually subsides and with it the swelling of the stricture and that of the caput gallinaginis; the semen then usually flows back into the bladder, where it mingles with the urine, although a small quantity may pass the stricture and appear at the orifice of the urethra. Such cases are of course restored to the normal condition by dilatation of the stricture or removal of the existing obstruction.

In absolute and permanent aspermia, it is self-evident, impotentia generandi is involved and the patient is sterile.

In relative aspermia male sterility is likewise and in so far present, as the semen fails to be discharged into the female genital tract. In this case an artificial impregnation with fresh semen discharged as a pollution may be brought about,

which succeeds very well in those cases in which the semen is normal. In temporary aspermia the procreative power of the patient depends solely upon the quality of the semen, although, as long as the semen remains absent, there can be no talk of impregnation. Sterility in cases of urethral contractions is, of course, *ceteris paribus*, cured by their removal.

2. *Polyspermia*.—This condition is relatively rarer than aspermia. By it is understood a considerable increase in the amount of semen discharged at a single ejaculation, which may be double or even three times the normal. If the semen be allowed to settle in a test-tube, it will be found that only the fluid is increased; the cell-elements, among them the spermatozoa, show, in comparison with the normal ejaculation, no increase. Microscopically the semen appears normal; living spermatozoa are seen in large numbers.

A single man, 40 years old, once consulted me on this account (see page 86).

3. *Oligospermia*.—By this is meant the discharge of very small amounts of semen. The amount evacuated at a single ejaculation usually varies from 2 to 5 grammes. This condition is found very commonly in advanced age; likewise after inflammation of the testicles and diseases of the prostate, such as usually follow gonorrhœa. The diminution in the amount of

semen after these inflammations in the genital tract is readily accounted for by the deficiency of one or another of the secretions which collectively constitute the ejaculated semen. Thus, in obliteration of the vasa deferentia the semen contains no longer the secretion of the testicles, and after spermatitis or prostatitis the secretion of the vesiculæ seminales as well as that of the prostate may be very essentially diminished. In such cases, therefore, oligospermia is often associated with azoöspemia.

As already mentioned, the *color* of normal semen is whitish, like that of boiled starch. The dried stain of semen, which stiffens the linen in a characteristic manner, has, while fresh, a light, grayish-white color and a narrow, brownish-yellow border. In disease, especially of the genital system, the semen may assume various shades. Thus are found: —

1. Semens of *red*, *reddish-brown*, and *brownish-yellow* color. These shades are generally due to the admixture of blood. The blood in these cases arises, for the most part, in the prostatic portion of the urethra, where, in the neighborhood of the caput gallinaginis, a chronic urethritis has become localized. The blood may, however, come from the seminal vesicles along with the semen. In the first case the dried stains on the linen appear irregularly colored. On the rusty-brown stains there are usually small blood-

specks, while in the second case the stains appear evenly colored, which indicates an intimate mixing of the blood with the semen, as might happen in the seminal vesicles. The brownish-yellow semen contains, usually, blood and pus in varying proportions.

The cause of bloody pollutions is generally gonorrhœa of the posterior urethra, the *pars prostatica urethræ*. Not infrequently in the fourth week of acute gonorrhœa priapism with bloody pollutions sets in. These often last only a short time and then disappear entirely, yet they sometimes continue and may persist many years with undiminished power, if no check is put on them by local treatment. In many cases the bloody pollutions do not occur until later and are then a sequel of chronic gonorrhœa. The semen may also be bloody after masturbation and sexual excesses in general, in various diseases of the prostate and seminal vesicles, as well as in cancerous degeneration of these organs.

The bloody pollutions which sometimes occur in acute gonorrhœa not infrequently become purulent. In such cases the color of the stains on the linen are observed to gradually change from red and reddish-brown to brownish-yellow and yellow.

2. *Yellow semen.* The color of these stains is usually due to pus. In this case the stains have a yellowish or greenish color. The pus

comes, for the most part, from the urethra and mingles only imperfectly with the semen during ejaculation. These stains have not, therefore, an even yellow color, but the pus appears on the dried seminal stain in smaller or larger patches, irregularly distributed. The pus may, however, in inflammation of the seminal vesicles, come directly from these organs and then the stains appear evenly yellow colored. Yellow semen of the first kind is very commonly found in chronic inflammation at the neck of the bladder, whereas the evenly colored pollutions appear more rarely and are only found well marked in chronic spermatitis.

As for bloody pollutions, so also for purulent yellow semen the commonest ætiological factor is gonorrhœa, and, as already mentioned, the bloody pollutions not infrequently become gradually transformed into the purulent.

3. *Wine-colored or violet semen.* The color of these pollutions is, especially in the dry state, very characteristic. It arises from indigo. The freshly discharged semen shows only a grayish-violet tint, yet with the microscope it is possible to demonstrate a large amount of blue crystalline indigo. The wine-red color of this semen, which is due to the red modification of the indigo, often gives occasion to its confusion with bloody semen. A microscopical or chemical test for blood shows at once the coloring

agent of the semen. Besides, the coloring of the stain on the linen is very even, which, with bloody semen, is very seldom the case.

Blue semen I have never seen, yet there must be such, even though rare. I infer this, because in my collection of seminal stains, discharged as pollutions and dried on linen, there is a specimen of *grass-green* semen, the color of which is the result of the strong indigo and pus contained in this semen. In semen containing indigo there are usually living spermatozoa in normal numbers. Such pollutions occur in very nervous individuals, especially after venereal excesses or masturbation.

It may also be here remarked that the pollutions of jaundiced persons show a brownish-yellow beer color.

Freshly evacuated, normal semen contains living spermatozoa in large numbers. The motion of the majority of the spermatozoa is very active, only a few moving more slowly. A normal, healthy semen should show in the microscopic field, with a Hartnack objective 7 and ocular 3, about 100 living spermatozoa.

According to the relative numbers of the spermatozoa two distinct pathological conditions are recognized, namely, *oligozoöpermia* and *azoöpermia*. By oligozoöpermia is understood a marked diminution in the number of spermatozoa, while azoöpermia means their total ab-

sence. Oligozoöstermia often occurs in advanced age, yet it is found still more frequently as a congenital condition in youth. Very often also it is found that the few spermatozoa that are secreted are, even in a perfectly fresh state, motionless and for the most part dead (Fig. 10). The commonest causes of oligozoö-

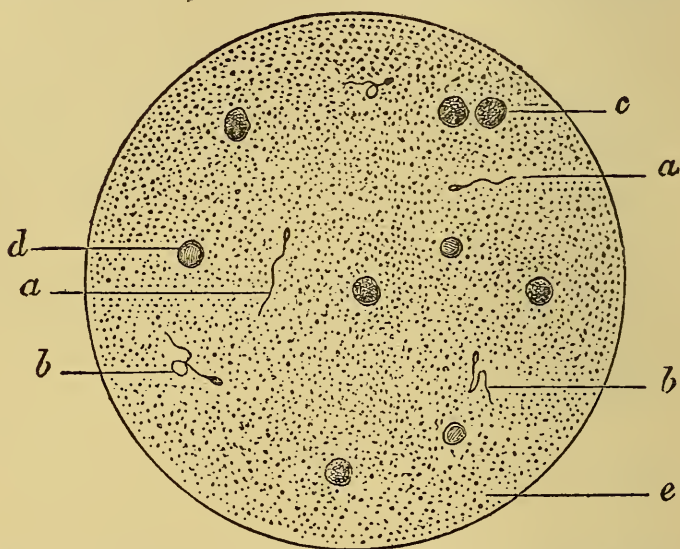


FIG. 10. — Semen of Oligozoöstermia. *a*, Living spermatozoa; *b*, dead spermatozoa; *c*, pus corpuscle; *d*, blood corpuscles; *e*, seminal granules. 300 diameters.

spermia are the gonorrhœal inflammations of the epididymes and spermatic cords. By these inflammations is brought about sometimes complete and sometimes only partial obliteration of the vasa deferentia. The passage of the spermatozoa from the testicles to the seminal vesicles becomes thereby very imperfect and scanty.

Not infrequently are found also, under the microscope, numerous pus corpuscles, molecular detritus, and spermatie crystals.

Besides gonorrhœal epididymitis, tuberculosis and new growths of the testicles may cause oligozoöspemia as well as azoöspemia. The former condition may pass gradually into the latter. Very rarely does the reverse take place, although it is possible in the first year after epididymitis. If 3 or 4 years have elapsed since the epididymitis an increase of the spermatozoa cannot be looked for.

Oligozoöspemia involves sterility only when the sparsely secreted spermatozoa are at the same time motionless, *i.e.*, dead. If the spermatozoa distinctly show motion, there is always procreative power, although in a greatly diminished degree.

Just as common as oligozoöspemia, even more common, is complete absence of spermatozoa, *i.e.*, azoöspemia. This condition is always present before puberty, and sometimes, although rarely, in old age. But when azoöspemia is found in robust manhood, we have to do either with a congenital or an acquired condition. If the condition be congenital the testicles are usually found to be very small or atrophied. Sometimes there are also still other congenital anomalies of the sexual organs, such as cryptorchismus, hypospadias, and epispadias. These lat-

ter anomalies, however, do not always involve azoöspemia. Much more common is the acquired form. Here, as a rule, there have been gonorrhœal inflammations of the testicles and cords, with subsequent complete obliteration of the latter. In certain cases azoöspemia comes about gradually, at first with the occurrence of bloody, and then of purulent pollutions, until the semen finally becomes watery and the spermatozoa cease to appear. The bloody and the purulent semens generally still contain spermatozoa, but they are usually diminished in number and are often motionless, and at last, after repeated observations, they all at once disappear. Very frequently, however, azoöspemia comes about without previous bloody and purulent pollutions. The intensity and frequency of the inflammations of the testicles furnish no rule for the occurrence of azoöspemia. There are men who have had bilateral epididymitis 6 or 8 times and yet have normal and fruitful semen. On the other hand, very slight pain in the spermatic cords and a mild, unilateral epididymitis may bring about azoöspemia; the most intense inflammations of the testicles and epididymis often leave the semen unharmed, while sometimes very slight inflammatory processes in the testicles and spermatic cords result in azoöspemia. The size and density also of the remaining induration of the epididymis do not always

warrant an opinion as to azoöspemia, although it is of great importance, and, when bilateral, renders imperative an examination of the semen. Although in azoöspemia the semen discharged consists only of the secretions from the vesiculæ seminales, the prostate, and the other mucous glands of the urethra, and the secretion of the testicles is wholly wanting, yet there is not always a diminution in the amount of the semen in general. The *potentia coeundi*, also, is not always in these cases materially impaired. There are azoöspermous men who have very strong sexual desire, and who are able to perform the act of coitus daily and even several times a day.

The semen of azoöspemia, freshly discharged, exhibits the same peculiarities of coagulating and of smell as normal semen, which proves that these properties do not belong to the secretion of the testicles. When azoöspermous semen is allowed to settle in a test-tube, only a very little whitish sediment is formed. This consists mostly of epithelium from the seminal ducts and urethra, of seminal granules, and very often also of numerous well-formed spermatic crystals. Fresh azoöspermous semen not infrequently shows under the microscope colloid masses which sometimes consist of oval kernels, and sometimes exhibit the most varied spheroid forms in a concentric arrangement. Occasionally, also, fatty molecular detritus with small,

strongly refracting granules are seen. These forms are probably derived from the seminal vesicles. In fresh semen they often form clumps of yellowish bodies of the size and shape of grains of sago.

The so-called *spermatic crystals* are almost constantly found in azoöpermia. The thinner the azoöspermous semen is, the sooner these crystals appear and the larger they are. In normal semen they first appear after the lapse of many hours, even a day or two. They may be demonstrated if a drop is allowed to dry in the air on a glass slide. Under the microscope are then found imperfectly crystallized, colorless, whetstone-shaped forms, usually lying upon one another or arranged in rosettes.

The chemical composition of the spermatic crystals is not yet clearly understood. Böttcher considers them an albuminoid substance, Schreiner a phosphoric salt of an organic base. Other authors consider these crystals phosphate of magnesia or even ammonio-phosphate of magnesia. The later authors identify them with the so-called crystals of Charcot, and assume that they occur wherever there is a profuse secretion from mucous glands. Fürbringer maintains that these crystals are present neither in the secretion from the testicles nor in that from the vesiculæ seminales, but only in prostatic secretion. He also holds that the peculiar odor

of semen arises from these crystals. They surely do not belong to the orchitic secretion, for they are found in the most beautiful forms, and in the greatest number, in the semen of azoöspemia. Since, moreover, in the secretion of prostaticorrhœa the concentric prostatic concretions are common, while the spermatic crystals are only rarely found, and the latter are almost constant in the azoöspermous semen, so is the assertion not to be disregarded, that these crystals belong also, at least in part, to the secretion of the vesiculæ seminales.

The spermatic crystals are colorless, and belong to the rhomboid system of crystals. Under the microscope are found rhomboid tablets and rhomboid prisms. Sometimes two or more rhomboid prisms combine to form an oblique cross, or a rosette. When the crystallization is incomplete these crystals take the form of a boat or of a whetstone, of which the tapering angles are bent in an opposite direction (Fig. 6, page 85).

The spermatic crystals are not a product of decomposition of the semen, as was formerly supposed, for they are found in azoöspermous semen a few hours after ejaculation, and in normal semen immediately after drying on the glass slide. That the crystals in normal semen only appear late, often not until the second or third day, is explained by the abundance of liv-

ing spermatozoa in such semen. In a fluid full of movement, such as healthy semen, crystallization cannot take place. Only when the spermatozoa have gradually died and the semen becomes quiet, can the crystals form. Therefore, in normal semen they are first found after the lapse of 24 hours; in azoöspemia, on the other hand, in an hour or two.

Azoöspemia is usually a permanent affection. It occurs temporarily only a short time after inflammation of the testicles, and in oligozoöspemia when coitus is too frequently practised. Azoöspemia always involves male sterility, and is one of the commonest causes of unfruitful marriage.

In fresh, healthy semen the spermatozoa move with great activity. If the semen, however, be mixed with catarrhal secretion, with acid urine, or other harmful substance, the spermatozoa move either very sluggishly or not at all, even when the freshly ejaculated semen is immediately placed under the microscope. During inflammation of the testicles, of the prostate, and especially of the seminal vesicles, motionless spermatozoa are often found. In chronic catarrh of the seminal vesicles the majority of the spermatozoa, indeed sometimes all of them, are found, on examination, to be motionless. The catarrhal secretion, although it has an alkaline reaction, seems to exert a harmful influence on

the spermatozoa. It is usually observed, also, that the number is diminished at the same time.

Semen which contains only *motionless spermatozoa* is unfruitful. Whether the motionless spermatozoa, when they have been discharged into the female genital tract in coitus, ever regain their mobility is not known. I can only say that in several cases of unfruitful marriage I have found the spermatozoa motionless. I am forced to seek the cause of sterility in this abnormal condition of the semen, all the more because Professor C. Braun, on examining the wives of such men, has found nothing abnormal about the genitals. Semen, however, which, with a majority of the spermatozoa motionless, still contains some living ones, furnishes an analogous condition to that in which the semen contains only a few, but living, spermatozoa (oligozoöspermia); it is not absolutely sterile, although impregnation can only occur under the most favorable conditions.

Spermatozoa that are dead when discharged generally have bent or spirally twisted tails, as already remarked.

Of *abnormal* and *pathological forms* of spermatozoa may be mentioned: 1, spermatozoa with large hydrocephalic heads; 2, spermatozoa with 2 heads; and 3, those with two tails. These occur only rarely and alone, mingling with normally formed spermatozoa.

Among the pathological constituents of semen, observed with the microscope, besides blood and pus corpuscles and epithelium, is sometimes beautiful blue crystalline *indigo* in large amount. This occurs in corn-flower blue flakes and scales, and is found not infrequently in the semen of very nervous individuals.

The *secretion* of the prostate and of the accessory glands of the urethra, which is partly discharged with the semen and partly before it, appears to serve various purposes. In the first place it serves to dilute the semen in general, by which the free movements of the spermatozoa are made possible; then this secretion has also probably the function of preparing the urethra for the reception of the semen. The urethra is, as is well known, in its whole length to the caput gallinaginis, a canal which belongs as well to the sexual as to the urinary system. A canal, however, which usually serves as an outlet for the acid urine, cannot, without further modification, also serve as an outlet for the alkaline semen. The epithelial covering of the urethra, especially in its physiologically dilated portions,—for instance, the bulbus urethræ,—is moistened with the remains of urine, and these, *i.e.*, the acids of the urine and the urea, act injuriously on the spermatozoa. In order, then, to neutralize the urethral walls, made acid by the urine adhering to them, and to prepare them

for the alkaline semen, the secretion of the accessory urethral glands is discharged into the canal before the ejaculatio seminis, and, by virtue of its thick, viscid consistence, forms a coating on the walls of the urethra. This secretion, as is well known, appears during erection of the penis as a clear, transparent drop at the meatus.

The *treatment* of male sterility is rarely accompanied with favorable result. If the semen is mixed with blood or pus, disease of the caput gallinaginis or of the prostatic portion of the urethra is usually involved. In most cases of this sort the blood and pus become mixed with the semen only at the moment of ejaculation. Here cauterization of the pars prostatica urethrae almost always perfectly serves the purpose.

I use for this purpose a 5 per cent. solution of nitrate of silver and apply it by means of my urethral dropper. Of this solution I generally inject an amount indicated by from 3 to 5 marks of the scale on the piston of the small syringe [6 to 10 minims] (Fig. 11).

Already, after 3 or 4 cauterizations, which are done at intervals of 3 days, it becomes evident that the former bloody semen has regained its normal condition. The cauterization may be equally well carried out with urethral suppositories of nitrate of silver, applied through Dittel's porte-remède. If the blood and pus,

however, come from within the vesiculæ seminales evenly mixed with the semen, the cauterization will not accomplish much. Fortunately, however, this is a rare occurrence. The differential diagnosis between blood and pus from the prostatic urethra and from the vesiculæ seminales may be generally established by a microscopical comparison of the urinary sediment with the semen. If, namely, the urinary sediment contain neither blood nor pus corpuscles, if, however, they are found in the semen, it may be assumed that they come from the vesiculæ seminales.

Oligozoö spermia is the result either of diminished functional activity of the testicle or of stenosis of the vasa deferentia, a condition which is brought about especially by epididymitis and funiculitis spermatica. There can be no thought of operative interference with the vasa deferentia, on account of the fineness of their lumen, nothing therefore remains but to arouse the testicles themselves

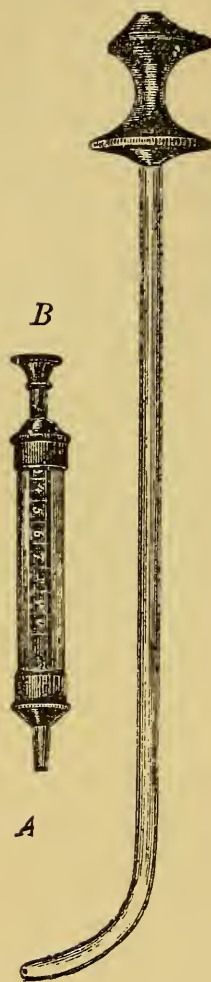


FIG. 11. — Ulzmann's Urethral Dropper. A, Capillary catheter; B, Pravaz syringe.

to increased secretory activity, and this is best accomplished by direct faradization of these organs. If the tissue of the testicles is still in a condition to form spermatozoa in large numbers, this not infrequently happens on the use of the induced current. At the same time the increased semen formation acts as *vis a tergo*, dilating the contracted vasa deferentia, and the spermatozoa may even be permanently increased in such semen.

Not so favorable is the result in azoöspemia. Here we have to do, as a rule, either with complete atrophy of the testicles, or with imperviousness of the vasa deferentia. If there be complete atrophy of the testicles all therapeutic measures will be powerless. If imperviousness of the vasa deferentia be the cause of the azoöspemia, faradization of the testicles may be tried. If only a plugging up, but not an obliteration of the vasa deferentia be present, in single rare cases recovery may ensue. If, however, there be complete obliteration, this treatment will be of no avail.

A favorable result then, as a rule, is only to be expected in azoöspemia when it has existed no more than a year, counting from a preceding inflammation of the testicle. If, however, the azoöspemia be of longer duration, there is nothing more to be hoped for from therapeutic means, for, even if the vasa deferentia could be made

pervious, there would have taken place already atrophy of the testicle during this long period of its loss of function. If the epididymes or the spermatic cords feel infiltrated, *i.e.*, thickened and hard, resorption by means of inunction and bathing should be attempted.

By *impotentia coeundi* is understood the inability to accomplish the act of sexual intercourse with erect penis. This inability is sometimes due to the fact that no erection at all can be brought about at the time of coitus, and sometimes that an erection takes place at the proper time, but it does not last long enough to make it possible to finish the act. In the latter case premature ejaculation is usually the cause of the penis becoming flaccid before the accomplishment of coitus. For the better understanding of male impotence the *mechanism of erection* of the penis and the *mechanism of ejaculation* of the semen should first be elucidated.

According to Kölliker and Kohlrausch *erections* come about in the following manner :¹ — Under the influence of the *nervi erigentes* the organic muscular fibres of the cavernous tissue relax, by which the spaces are widened and prepared for the reception of a large quantity of blood. The presence of this large quantity of blood in

¹ See also page 34.

the corpora cavernosa does not, however, alone explain the erection, for if the blood could flow out again, in a mass, as it flows in, a perfect erection of the penis would never occur. There must, in addition, be provided a contrivance by which the blood poured into the corpora cavernosa cannot immediately flow out again, and this end is accomplished by the following anatomical arrangement.

At the beginning of erection the muscular elements of the corpora cavernosa relax through the influence of the *nervi erigentes*. Thereby are opened at the same time the short arterial branches, anastomosing in the cavernous spaces — according to Joh. Müller, the *arteriæ helicinae* — and filling them with blood. From the corpora cavernosa the blood returns partly through veins which empty into the *vena dorsalis penis*, and partly through those which emerge from the interior of the corpora cavernosa by means of gaps in the cortical reticulum on the under side of the penis. If, then, the corpora cavernosa are distended with blood, the filling of the cortical reticulum, which forms the chief receptacle for the blood poured into the corpora cavernosa, necessarily exerts pressure on the outflowing veins, and the reflux of blood from the corpora cavernosa is checked. If now the relaxation of the corpora cavernosa, *i.e.*, the action of the *nervi erigentes*, be incomplete, a suf-

ficient quantity of blood cannot enter the erectile tissue to exert pressure on the outgoing veins, and the penis cannot be brought to a state of erection.

The mechanism of erection, then, is under the influence of the nervous system. According to Eckhard, erections can be excited in dogs by electrical stimulation of the brain as well as of the cord. In an analogous manner we observe that in men erections take place through the influence of lustful thoughts in the brain, as well as in certain forms of spinal disease. Peripheral irritation also, applied to the genitals, causes erection. Thus, with a full bladder, erections usually occur more easily and last longer than with an empty bladder. It is also known that during the night, in the dorsal position, the pressure of the viscera on the veins suffices to excite powerful erections. Also distention of the vesiculæ seminales, such as occurs in strict continence, gives rise to frequent erections. Constipation, lithiasis, diseases of the rectum, above all, diseases of the prostate, are associated with frequent erections. Especially inflammatory diseases of the prostate are not infrequently the occasion of prolonged erection of the penis, and even of painful priapism. Finally, it is well known that peripheral stimulation, as applied in masturbation to the glans and skin of the penis and to the testicles, causes erection.

There is, accordingly, no doubt that peripheral irritation applied to the genitals, as well as irritable conditions of the prostate, are able to bring about reflex erections.

Regarding the excitation of erections by peripheral nerve-irritation, Goltz has found that they are brought about more promptly and powerfully when, according to experiments on dogs, the cord is divided in the lumbar region. He concludes from this that there are also *inhibitory nerves of erection*, which proceed from the brain, and which are designed to check, to a certain extent, the occurrence of erection. The experiment on dogs with the severed lumbar cord plainly argues for this supposition. Erections occur more promptly on peripheral nerve stimulation, because with the division of the lumbar cord the inhibitory nerves from the brain have also been severed and thereby made powerless. The existence of inhibitory nerves of erections explains very well the occurrence of the psychical form of impotence, as will be more fully explained later.

To complete the subject, the *mechanism of ejaculation* must also be briefly considered.

Under normal conditions the ejaculation of semen occurs only with erect penis. With erection of the corpora cavernosa the caput gallinæ swells also; the mouths of the ejaculatory ducts are thereby directed forwards toward the

membranous portion, and at the same time the bladder is closed behind. By this process the urethra, which ordinarily serves only as a canal for the discharge of urine, is devoted to the use of the sexual system. That, with penis erect, the bladder is closed by the caput gallinaginis appears clear from the fact that it is impossible to void urine when the penis is erect, but very easy to discharge semen. Also the pain, felt in the perinæum during the ejaculation of semen in cases of tight stricture, shows that the passage backwards toward the bladder is closed to the semen.

Before the occurrence of ejaculation the glands of the urethra begin to secrete, and the secretion not infrequently appears, with strong erection, as a viscid, clear drop at the orifice of the urethra. The object of this secretion is probably, as already mentioned, to neutralize the urethral walls, bathed in acid urine, by means of a ropy, alkaline fluid, and to prepare them for the reception of the semen. When, in coitus, the moment of ejaculation approaches, a spasmodic sensation with voluptuous excitement is experienced in the perinæum, and the discharge of semen begins through the ejaculatory ducts. At the same time the prostate discharges its secretion. Then the semen, gradually pouring from the narrow ejaculatory ducts, is impelled forwards, since it

cannot go backwards on account of the swelling of the caput gallinaginis, and collects in the bulbus urethræ, the physiological excavation of the urethra. When a large amount of semen is collected here and the bulb distended thereby, reflex spasmodic contractions of the musculus bulbo-cavernosus are excited, and the semen gushes from the urethra.

That the semen, in coitus, is not ejaculated directly from the vesiculæ seminales or from the testicles, is evident enough from the anatomical relations, especially from the narrowness of the ejaculatory ducts, also from the circumstance that with frequently repeated coitus the relative number of spermatozoa in the ejaculated semen diminishes. The spermatozoa cannot quickly enough, and in proportionate numbers, pass from the testicles through the vasa deferentia into the seminal vesicles and thence appear in the ejaculated semen. The wide bulbous urethra, therefore, appears to serve as a temporary reservoir for the semen before it is ejaculated, and the function of the musculus bulbo-cavernosus seems to be to eject the semen. When the function of this muscular apparatus is impaired, as is commonly the case in the paralytic form of impotence, the semen is no longer shot out in ejaculation with force in a jet, but it dribbles slowly from the meatus, as fluid from a flaccid tube.

The following forms of impotence are to be distinguished: 1, *organic impotence*, which is usually absolute; 2, *psychical impotence*, with its variety, *relative impotence*; 3, *impotence* due to *weakness with abnormal nervous irritability*, which culminates in premature ejaculation; 4, the *paralytic* form of *impotence*.

1. *Organic Impotence*.—In this case, on account of organic malformation and mutilation, or on account of disease in the immediate vicinity of a normal penis, coitus cannot be performed. To this class belong extensive hypospadias and epispadias, deficiency or abnormal smallness of the penis, elephantiasis and tumors of the penis, deviations and curves of the penis on erection due to partial destruction of the corpora cavernosa in consequence of wounds and cavernitis, finally swellings in the surrounding parts, such as large herniæ and scrotal tumors, etc. Also general corpulence, with a very prominent, overhanging belly, may, in many cases, render coitus impossible. With the organic form of impotence there may be very strongly developed sexual desire. Ejaculation may take place in a normal manner, but the insertion of the penis, on account of the organic changes mentioned, has become impossible. Organic impotence is, for the most part, absolute, and only rarely accessible to therapeutic measures.

An interesting case in this connection, which

I have published in another place, may be here briefly mentioned.

Adolf J., 41 years old, employed here in a bookstore, was originally baptized as a girl, with the name Adolfine, because his genitals, affected with extreme hypospadias and cleft scrotum, were at birth considered feminine. He wore girls' clothes until his 20th year. But when later his beard had begun to sprout and his voice to assume the masculine character, the patient was subjected to a careful medical examination and his sex established. From this time he assumed the name of Adolf, and wore men's clothes.

On examination, the following condition was found; with the thighs spread apart, the genitals had the appearance of a vulva. The small scrotum was split into two parts. The right half was somewhat thicker than the left, and contained a small testicle; the left none. The urethra of the pars pendula and subpubica was completely wanting. The meatus was situated in the lower angle of the cleft scrotum. The penis, very small, was firmly adherent to the right half of the scrotum, so that when the thighs were spread apart, there appeared the cleft scrotum with delicate rose-red skin, like the female vestibule. The glans penis was closely joined to the upper wall of the urethra in the lower angle of the cleft scrotum.

The patient had strong sexual desire and was, strange to say, married, yet, of course, was unable to perform the act of coitus. He satisfied his desire by friction of his genitals against those of his wife, whereupon ejaculation followed. On erection half of the scrotum bulged out with the enlargement of the penis.

This patient desired me to make him, by operation, a penis capable of intromission. I attempted the operation, and, indeed, succeeded in producing a small, freely movable penis, which could be partially inserted, to the great joy of the patient.

2. *Psychical Impotence.*—This form of impotence is usually of a temporary nature. It is commonly observed in nervous individuals. They are either candidates for marriage in advanced age, or persons who have masturbated a great deal in early youth, or those who have had gonorrhœa complicated with prostatitis, catarrh of the bladder, and inflammation of the testicles. In the first case it is usually a lack of confidence in his power to accomplish the act that makes the patient impotent. These men find themselves, on account of a promise of marriage contracted, in a great state of nervous excitement, and have a dread of not being able to perform their conjugal duties in a suitable manner. In consequence of this nervous excitement the action of the inhibitory nerves

from the brain is aggravated and the erection fails at the critical moment. The influence of fear and dread on the occurrence of erection may sometimes be studied on the examination of such patients with sounds. When they have unfastened their clothes and have stretched themselves on the table the penis is seen gradually to shrink, grow smaller, and to move in a worm-like manner. The corpora cavernosa become smaller and harder, the diameter of the penis in the pendulous portion is less than that of the glans. To the touch the penis feels cartilaginous, the skin shows transverse folds due to the contraction of the corpora cavernosa. These appearances can only be explained by spasmodic contraction of those organic muscular fibres which are embedded in the trabeculæ of the corpora cavernosa. This contraction is a manifestation of the action of the inhibitory nerves of erection stimulated by the fear and dread of catheterism. In exactly the same way, then, other purely psychological influences stimulate the action of the inhibitory nerves, and the patient is, at such moments, impotent.

In case of masturbation there is another factor to be taken into consideration. Men who are not accustomed to normal coitus, who employ unnatural means for the gratification of their sexual appetites, may not succeed in the

performance of their conjugal duties, but still may be fully competent to cohabit in the usual manner with prostitutes. A failure in the marriage bed so discourages these patients that, after repeated attempts, they become incapable of getting an erection, although powerful erections may occur at other times.

It is also a remarkable circumstance that sometimes such patients, who were formerly in a high degree potent, become temporarily impotent after a gonorrhœa, especially when complicated with catarrh of the bladder, prostatitis, or inflammation of the testicles. In these cases the gonorrhœa has apparently exerted a paralyzing influence on the nervous apparatus of the prostate.

The prostate contains in its superficial layers lining the urethra, as well as in its cortical layers, extensive nervous plexi, interspersed with ganglia, and to this arrangement belongs, among other functions, that of reflexly exciting erections. The ordinary pressure of a metallic catheter or sound is not infrequently followed by strong erection of the penis. Likewise cauterization or the application of astringents to the prostatic urethra produces erection. It is also well known that tumors of the prostate, calculi, and especially inflammations of the prostate, are very often accompanied by painful erections — priapism, much against the will of the patients.

There is, then, scarcely a doubt that from the prostate reflex erections can be produced. The reflexes, however, are transmitted by the nerve branches, and when these latter have become altered in any way, *e.g.*, by inflammation, as in prostatitis, impotence following gonorrhœa is explained.

All these processes, however, give rise, as a rule, to a transient, temporary impotence. In all cases psychical influences of the most varied kind take part, and only after the gradual removal of these latter will the patients again become potent. I know of cases where, one and two years after marriage, the wife had not been defloured; later, however, the impotence passed away gradually and the women bore one child after another.

Patients affected with psychical impotence usually have a normal genital apparatus. In certain cases, however, azoöspERMIA is found. These patients, when they lie alone in bed, have very powerful erections—in distinction from the paralytic form of impotence,—yet as soon as they attempt coitus, which they generally approach with doubt, anxiety, or fear, there is either no erection or a very imperfect one. The prognosis of psychical impotence is usually favorable.

Relative psychical impotence is that form in which the patient is unable to perform the act

of coitus with certain women only. It is very unpleasant when the impotence is manifested toward the patient's own wife, as is not infrequently the case. In such cases a mutual aversion generally plays an important part, or at least an aversion on one side, especially of the wife. In marriages which are contracted, not from love or mutual affection, but from material interests, this form of impotence is not infrequently found. There are men who can at any time and with any woman perform the sexual act, yet there is still a large number of men who can do it only when the woman willingly yields herself. A large contingent is furnished by those individuals who are endowed with sensitive nerves, such as so-called book-worms, literary men, and it is no rare thing for such intellectual men to play a lamentable rôle in sexual intercourse, partly indeed, from natural awkwardness.

3. *Impotence due to weakness with abnormal irritability.*—This form of impotence is always distinguished by premature ejaculation. The man so affected enters upon coitus with penis erect. Just, however, as he is about to begin the act, even before the penis can be introduced into the vagina, ejaculation and immediate flaccidity of the organ take place. This form of impotence with premature ejaculation is very common with persons who enter upon coitus

under great excitement, furthermore with those who have been given for a long time to the vice of masturbation, and who have frequent nocturnal emissions. In such cases the reflexes act much too quickly.

With many men, affected with this form of impotence, the performance of coitus is an impossibility, since on each attempt ejaculation follows too soon. In milder cases, however, the first attempt only fails, while the second and third coitus, performed somewhat later, succeed perfectly.

If such patients are examined with the sound, the urethra is found to be excessively sensitive, especially in the posterior portion — the pars prostatica. The patients cry out and behave as if mad as the sound passes the prostate. In this state of things it appears clear why, with the hyperæsthesia of the urethra, the reflexes which go out from it are excited too quickly.

The prognosis of this form of impotence is favorable. It not infrequently disappears of itself.

4. The *paralytic form of impotence*. — This differs from the other forms in that erections never take place. Such patients not only have at coitus a flaccid penis, but erections occur no longer at night or at any other time. In mild cases a half-erection may still occur, and with a large vagina coitus may be possible, but fre-

quently the penis wilts even within the vagina. Ejaculation also is abnormal, since it either does not occur at all or else very late. During ejaculation the semen comes no longer in jets, but very slowly — gradually drops, as it were, from the urethral orifice. This form of impotence is observed not infrequently as a symptom of chronic general diseases, as in diabetes mellitus, in the morphine habit, in cerebral and spinal diseases, and cachexiæ of various kinds. Lesions of the centres of erection in the cord are involved. The affection is not infrequently associated with spermatorrhœa.

On examination the genitals are found withered and flaccid. The skin of the penis and the testicles is only slightly sensitive, indeed even anæsthetic. The sensitiveness of the urethra is much diminished: the sound passes with ease and without pain into the bladder. Not infrequently the skin of the thigh and in the vicinity of the genitals is found much more sensitive to the electric current than that of the penis and scrotum.

The immediate cause of this form of impotence is not always clear. A large proportion of the cases is furnished by masturbators, and profligates who cannot desist from their practices.

The prognosis is doubtful. In young persons in whom the power of erection is not wholly lost, improvement and even recovery may be

attained; in older patients, however, restoration of power is scarcely to be expected.

The *treatment* of impotence varies according to the different forms of the affection.

In organic impotence, as a rule, improvement or relief can be obtained only by surgical means. In hypospadias and epispadias, by plastic operations, improvement of the condition may be brought about in so far as a small, freely movable penis capable of intromission can be formed. In the case of tumors and elephantiasis of the penis, the former must be removed as well as the hypertrophied integument in the latter, at least in part. With infiltration in the corpora cavernosa, causing distortion of the erect penis, the endeavor must be made to bring about resorption of the infiltration. If syphilis is involved, antisyphilitic treatment with iodine and mercury will have a favorable influence. In traumatic cavernitis, or in advanced age, a restoration of the destroyed reticular structure of corpora cavernosa is inconceivable. Yet even here iodine, local applications for the promotion of absorption, compression by means of strips of sticking-plaster, and lukewarm douching may be tried. The large irreducible herniæ as well as great swellings of the testicles, especially hydrocele, may be remedied by operation.

The psychological form of impotence not infrequently disappears spontaneously, when the

mental disturbances, on which the impotence depends, vanish. Thus men may suddenly become impotent when those most dear to them have been snatched away by death, or when they have unexpectedly lost their property. In these cases pain, grief, and misfortune have a paralyzing influence on the centres of erection. When, however, in the course of time their circumstances improve and they become quieted, the impotence vanishes. In such cases the friendly advice of a physician, who possesses the confidence of his patient, has a very favorable influence.

Most commonly, however, this form of impotence is found in nervous young men who have previously been addicted to masturbation, or have had severe gonorrhœa. Nervous individuals and those who have read books which paint in vivid colors the consequences of masturbation and sexual excess, and show them in the worst light — such persons make up the largest number. Quinine, iron, cold water bathing, country and especially mountain air and travel form the groundwork of the general treatment. Much more efficacious, however, is the local treatment. In these cases the erectile power of the penis is by no means extinct. There is merely a functional disturbance, in that the erections always occur at the wrong time and never when they are wished for. Local treatment must then

have for an object, in an artificial manner, by means of instruments and local applications, to bring about erections at a time when the patient thinks an erection cannot take place. The occurrence of an erection in such an unexpected manner strengthens the self-confidence and the trust in his own sexual power so much that the patient becomes very soon potent.

Since, as has already been explained in detail, erections may be excited from the prostate, so in the local treatment of impotence the prostate forms the point of attack for instrumental manipulation. The following methods are to be recommended: —

1. Treatment with *sounds*. This consists in the daily passage of heavy, metallic sounds of a moderate curve, usually from Charrière Nos. 20 to 30, with the patient in the horizontal position, the sounds being passed into the bladder, and allowed to remain there for from 5 to 10 minutes. With the sound in the bladder it is well to keep the distal end depressed by means of a towel or otherwise so as to increase the pressure and tension on the prostatic urethra. Here the metallic pressure alone acts on the prostate, and it not infrequently happens that erections are excited thereby while the sound is still in the urethra, sometimes after a few days, in certain cases even in the course of a few minutes. In a similar manner acts —

2. The *Cold Sound* or *Psychrophor* (see page 98). The sound having been passed into the bladder with the patient in the horizontal position, the air is exhausted from the free end of the outflow tube with a hand syringe, and the water begins to flow through the cold sound by siphon action. The water flows through one half of the sound to the vesical end, and from thence back through the other half into the empty vessel. Here the metallic pressure and the temperature of the water circulating through the sound act together on the prostate. Usually the water is used as it is taken from the water-main, that is, at a temperature of from 9° to 10° Réaumur [52° to 54° Fahr.]. If patients are very sensitive to this temperature water of from 14° to 16° Réaumur [63° to 68° Fahr.] may be used. Not only cold but heat sometimes works remarkably well. In cases where cold water has no effect, warm water of 30° Réaumur [100° Fahr.] and over may be allowed to circulate through the sound. It may be observed in certain cases that heat excites erections more quickly and powerfully than cold. Irritation by means of heat exerted on the prostate through the cold sound is one of the best means of exciting erections.

3. The *treatment* of the *pars prostatica urethræ* by means of *astringents*. Just as heat and mechanical irritants, astringents also act on the

prostate by exciting erections. Even simple irrigation of the posterior urethra with weak solutions of zinc, alum, and other agents not infrequently causes erections; astringents, however, are best used in the form of small urethral suppositories, which are placed in the prostatic urethra by means of Dittel's porte-remède (see page 100). Tannin works well in suppositories containing, at first, 0.05 gramme, latter 0.1 gramme.

Patients should retain the suppository about half an hour, before urinating. On urinating, the penis usually swells with a painful sensation, and, later, erections occur more frequently and more powerfully. These urethral suppositories may be introduced every day, or at least every other day, until the erections have become powerful and enduring.

A 5 per cent. solution of nitrate of silver, applied by means of the urethral dropper (see page 138) acts in a similar way.

In impotence due to weakness with abnormal nervous irritability, which is associated with premature ejaculation, in connection with cold douching the cold sound and mild cauterizations of the caput gallinaginis by means of the urethral dropper work especially well.

In the paralytic form of impotence the results of local treatment are not encouraging, yet the favorable effect of the treatment with sounds,

of the cold sound and the tannin suppositories, may sometimes even here be observed. It is important to advise for these patients complete abstinence for a long time from attempts at coitus. Also all other sexual excitement must be strictly forbidden. Cold water treatment in connection with electricity may here accomplish excellent results.

In cases where, on ejaculation, the semen is not discharged in jets, but dribbles sluggishly from the urethra, faradization of the musculus bulbo-cavernosus is to be recommended. For this purpose one pole, in the form of a metallic rectal electrode, should be pushed into the rectum and the other pole placed on the raphe of the perinæum. In normal, healthy men, when the current is increased, the perinæum is felt bulging out powerfully through the contraction of the muscles, while in the paralytic form of impotence this phenomenon occurs to a very slight degree or not at all. Faradization, then, should be carried out in the manner described above until a distinct and powerful contraction of the musculus bulbo-cavernosus is observed to take place. In many cases, however, local faradization also avails nothing.

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